

Rediscovering the Familiar

An Anthropological Approach

*Edited By
Ranjana Ray*



UNIVERSITY OF CALCUTTA

REDISCOVERING THE FAMILIAR

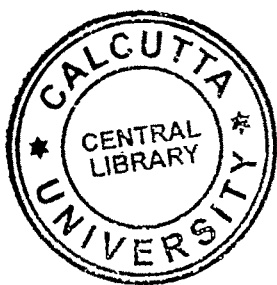
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Preface

Present volume is an outcome of the research activities of the faculty members of the department of Anthropology, Calcutta University. Under the special assistance programme of the University Grants Commission faculty members have taken up research projects, related to the UGC approved thrust area "Man and environment, with emphasis on women, weaker section, disabled and senior citizens." Under the said programme UGC has sanctioned grant for publication. In addition to the research results of the faculty members of this department, some relevant papers on the thrust area are included in the volume. These are from scholars belonging to such disciplines as modern history, education, psychology and anthropology.

Kamlesh Mohan deals in her paper with the British policy in studying the peoples of India and points out its implication on Anthropology and contemporary Indian society. Nandini Bhattacharya and Ranjana Ray's paper is on the prawn seed collectors of Sunderban areas of West Bengal. Gopal K. Chakraborti made a study of the market and agricultural practises related to development of their lot. Manibrata Bhattacharya's paper shows that the rituals in a society symbolizes integration, identification and communication. Shyamalkanti Sengupta worked among the Santars, Ho and Munda of the village Chakulia in Ghatshila, the state of Jharkhand. He focused on sustainable development and suggested value of ethnosciences in the realm of resources and environment thereof. Buddhadeb Chaudhuri in his paper laid emphasis on the problems arising out of improper forest management. He pointed out the difficulties faced by the rural people, especially women, with respect to fuel and commercial plants. Surinder Nath makes a study on prediction of stature from the upper limb bones. It shows that the regression formulae are both population and sex specific. Arup Ratan Bandyopadhyay's paper is a study of the reproductive performance of some Santal women with a view to identifying possible intervention strategies for the betterment of their health and nutritional status. A. B. Das Choudhuri together with A. Ghosh made a biomedical study and found out significant positive relationship between central obesity measures and risk factors of coronary heart disease. Samvit Kaul's paper deals with the understanding of the environmental factors for serious noninfectious diseases in Human population. A. K. Bhalla studied growth of subcutaneous fat of some well off children of Chandigarh. The research indicated population specific

variation of adiposity status. Tehal Kohli, an educationist, discusses the portage service delivery for the delayed young children from birth to six years of age. Surendra Nath Banerjee, former professor, Psychology Research Unit, Indian Statistical Institute, wrote on the detection of mental retardation. His focus group is primary school children of Tripura. Vidhu Mohan's paper is on the application of Psychology for the welfare of society. She took up several points, namely, personal development, family life adjustment, educational and vocational growth, application of psychology to the area of work, application of social psychology for social welfare, childhood issues and clinical disorders. All the papers in this volume are related to the thrust area specified. The papers by Kamlesh Mohan, Samvit S. Kaul, A. K. Bhalla, Tehal Kohli, Vidhu Mohan and Surendra Nath Banerjee were presented in the symposia of the Anthropological and Behavioural Sciences of the ninety-first session of Indian Science Congress, which the editor had presided upon. These papers are included in this volume because of the relevance of the topic. The editor is grateful for the support of the above-mentioned authors.

The editor acknowledges the secretarial assistance provided by Miss Monomita Ganguly. Dr. Prabir K. Das has very kindly gone through the proof. Miss Devalina Gopalan is thanked for giving a name to the volume. Ms. Nandini Bhattacharya and Sri Utathya Lahiri designed the front cover. The editor is grateful to Mr. Pradip Kumar Ghosh, superintendent of Calcutta University Press for publishing the volume. All effort is made to make the volume free of error.

Ranjana Ray

Coordinator

Departmental Special Assistance

Under University Grants Commission

Anthropology and Indian Society : The Colonial Experiments

KAMLESH MOHAN

In his book *Anthropology and Colonial Encounter* (1973), Talal Asad insisted that his aim was not to uncover the complicity of anthropologists with colonialism but to understand the location of anthropology within the colonial context. However, the issue of complicity has engaged the serious attention of social scientists especially historians of imperialism and colonialism as well as of the researchers of the role of science and technology in the building of empires. In my long-term project *Conceptualization of Social Categories in the Colonial Writings on the Punjab (1840s to 1940s)*, I have emphasized the relevance of both these issues as de-colonization process has reached its climax.

In the present paper, I have focused upon the location of the 'amateur' colonial ethnographers (who later occupied Chairs as Professors of Anthropology in the Universities of Oxford and Cambridge) and their experiments in refiguring and reconstituting Indian society. Their ethnographic explorations formed an integral part of the British imperial project of developing an administrative system, which was capable of exerting greater social control for the twin goals of political domination and colonizing the Indian economy¹. The groundwork for such an ambitious project was done by a large number of Orientalists, Christian missionaries and administrators-turned-ethnographers. As this paper is primarily concerned with the role of colonial ethnographer in freezing and formation of the caste-identities of the Indian people, it may be pointed out that their investigations were not motivated by intellectual curiosity which was the distinguishing feature of the work of the early Orientalists namely, William Jones, Charles Wilkins, Henry Colebrooke and surveyors like Colin Mackenzie and Francis Buchanan (Prichard, 1813:318,331,390 and *passim*). In fact, the British Indian ethnology—a description of the Indian population in terms of a physicalist paradigm of 'race'—was not just another variety of Orientalism. It compromised between the latter's 'politics of difference' (Van der Veer, 1993:23) and a set of 'anglicizing' strategies that tried to assimilate this difference. It owed much to the utilitarian emphasis upon personal observation and critical analysis which ran counter to Orientalist's dependence upon Indian language teachers, translators and commentators (of Ludden, 1993). Aided by the novel discipline of statistics, it assumed that a population inhabiting a 'territory' (a two-dimensional space that could be outlined on a map) can be better known by personal observation, enumeration and description. This was described as the scientific method, which was used as a colonizer.

The main focus of discussion in this paper is the colonial ethnographic

thinking, especially, its locale where information about caste was collected, classified cross-tabulated, compared and presented. A detailed information about 'caste-structure' and its essential attributes and vulnerability of each of the groups;² As these census reports, social surveys, ethnographical accounts, caste-index volumes and cadastral surveys generated information about land, health, disease, climate, occupation, religion and social structure for official use, it can be inferred that colonial ethnography was used as an instrument for the formulation of an imperial strategy to understand and master the use of keys for social control.

I

The empiricist studies of Bengal, Punjab, North Western Provinces and South India had indicated that the concept of a multi-ethnic society and its central polarity had gradually acquired a definite shape in the minds of the imperial policy planners.³ Risley's justification gives a fairly good idea of the motives and objectives underlying the official studies into the integral organization of Indian society:

The native society is made up of a network of subdivisions governed by rules, which affect every department of life. How that society will behave under novel conditions, what use will it make of any particular form of political representation are questions, which cannot be answered without fairly minute knowledge of the internal organization of society.⁴

In other words, a thorough knowledge of the ethnic composition of the subject society was regarded as an important aid in determining the proper representation of different segments of populations in the representative bodies. In this manner, no particular group could monopolize power. This consideration was to become increasingly important in the colonial reform policies and electoral politics in the early twentieth century India. Ethnicity had an economic dimension as well because caste status, as Risley speculated, was often an index of wealth. Hence, an ethnographic survey would not only ensure an equitable distribution of wealth but would also facilitate the assessment of any direct tax.⁵

The British rulers were, perhaps, not enamoured of Risley's scientific interests but they sponsored his scheme of ethnographic survey with two expectations. First of all, they were searching for a depressed underclass to serve as a counter-weight to the majority Hindu community. Secondly, the colonial state was keen to acquire a more minute knowledge about the Indian society in order to face the sensitive question of social reforms without hurting the sentiments of the masses at large.⁶

In order to deal effectively with the current social problems such as infanticide and to devise broad policy measures to influence the course of the social reform movements, the British rulers had decided to co-ordinate their "technology of governing", in Foucault's Phrase,⁷ with the detailed knowledge

about the religious and social customs of the people inhabiting village, Tehsil, district and provincial spaces. Herbert Risley believed that the Bengal model would be applicable to the rest of India.

In fact, the British had attached a great value to the role of knowledge in the exercise of imperial power. Thus, the settlement surveys, population censuses and reports of economic and cultural practices, compiled through the British period, should not be regarded merely as products of the administrative system but a corollary to the imperial perception of the vital relationship between governability of India and knowledge about its social morphology. While advertising its object, the Ethnographic Survey of India (to be conducted as a part of the **Indian Census, 1901**) in the first volume of **Man** in 1901, stated :

The entire framework of native life in India is made of groups of this kind (castes and tribes) and the status and conduct of individuals are largely determined by the rules of the groups to which they belong. An ethnographic survey is as necessary an incident of good administration as a cadastral survey of the land and a record of the rights of its tenants.⁸

In accordance with this classic formulation in contemporary morphological sociology, the entire land mass of India was mapped, recorded and allotted to the newly created landlords and old occupants and they were subjected to legal controls; similarly, the social world of India was split and reconstructed into defined caste identities and religious communities which were to be controlled by their respective rules and customs. In 1881, C.L. Tupper, who had codified the **Punjab Customary Law**, had also argued on the similar assumption i.e. the Indian Society especially Punjabi society was primitive. He proposed that the British Government:

Must ascertain the level in civilization at which your tribes, your villagers or your joint families stand; and the more nearly your proposed rules of law are on a line with that level, the stronger is the presumption that they will suit real needs.⁹

Thus, Tupper had reinforced and refined the theory about the relationship between imperial knowledge of the nature of Asian Societies and efficiency of its administration. A new concept of rule by reports/records' had been crystallized in the British colonial discourse.

II

It is essential to identify the points of time when it became an official policy to promote the acquisition and publication of such knowledge. It varied with

various provinces. For example, in 1851 Memorandum of Thomason, the recently appointed Lieutenant Governor of U.P was circulated to all commissioners and collectors.¹⁰

Caste became a special target and site of knowledge for the ethnographer in the first three censuses of British India, i.e. 1911, 1921 and 1931. Their content pages reveal that caste, which had been firmly located as the essence of Hindu religion, formed a special chapter and was related with a variety of data : sex-ratio, Vernacular and English literacy, age distribution and occupational patterns. It may be said that collection and the reproduction of sociological and anthropological data about caste in the successive all India or provincial census reports was done with a view to highlight the attributes of Indian people. This idea was expressed in the *Third All India Census Survey, 1891*.

What was the value of this qualified and quantified information about caste as the administrative strategy? Saumarez Smith has argued that the development of administrative records and survey reports in colonial India was linked to the formulation of a new strategy of political control in the second half of the 19th century. In this view, there was a correspondence between the gradual construction of an official understanding of Indian society and the gradual extension of the rule of law.¹¹ After 1840s, caste, in the village records and settlement reports, became a reference point for defining customs, rights and duties particularly revenue obligations instead of each village negotiating the terms of running its own affairs.¹² Thus, village society became fragmented into "countless statutes in knowledge and law".¹³

Unlike 'village community', which had the resilience to survive the ruin of empires, caste was a different kind of concept, serving different purposes. More a unit of knowledge than administration¹⁴, its importance for the colonial administrator-turned- ethnographers lay in the fact that it embraced the whole of India and all sections of Indian society. Having limited utility as a unit for revenue assessment, it could be more easily manipulated for controlling 'majorities and minorities' through number of laws and constitutional measures by statutory imperial government. That was why from 1840s. onwards, institution of caste was gradually impaled in the settlement reports and other records. But before caste or agricultural and other tribes could be used as foci for the enactment of law, statistical picture incorporating colonial view of caste had to be officially constructed, published and shared by the members of the ruling classes. Hence, Indian census from 1860s and 1930s was perfected as an instrument for breaking Indian society into a group of individuals, and then piecing it together through quasimathematical methods. Having composed this statistical picture of society, the British Government was no longer obliged to function through the mediation of 'powerful families' or the 'little republics' or village communities.

As the British perceived caste as a site of multi-purpose information and

statistical tool for generating a synthetic understanding of Indian society, all data about 'caste' was not useful for them. A careful perusal of the various census reports would show that 'numerical' status of a caste was an important consideration for special attention. For example, the first caste census of North Western Provinces (NWP) in 1865 contained statistics about the population concentration of the most numerous sub castes of **Brahmins, Kshatriyas, Vaishyas, and Shudras**¹⁵. The NWP Census of 1872 recorded numerically dominant castes by pargana. Out of 304 separate sub-divisions, of the non-twice-born castes, it was said that district-wise tabulation would be drafted only for 50 sub-castes, which comprised the main body of the persons classes under 'other castes' as differentiated from the 'Great Castes'. In the NWP Census of 1881, provincial officials were instructed to collect data only for numerically important castes. As a result, it presented a statistical picture of the 'Eleven Large Castes' 'Ten Large Agricultural castes' and thirty seven castes of the non-twice-born castes whose numbers exceeded 1,000,000.¹⁶ However, in the case of Punjab, where caste had more fluidity than elsewhere in India, owing to the presence of three interacting religious communities : **Hindus, Sikh and Muslim**, the multiple criteria of caste, religion and occupation was used to determine the status of individuals. The political importance of communities in the past, too, was kept in view while composing a picture of the Punjabi society. Hence, the concept of 'majority and 'minority' was defined in terms of religion.¹⁷ The British were also interested in recording those minorities like **Aggarwals** and **Marwaris** as these people had a wide inter-regional network. Another category of minorities that figures in the population census reports had a reputation for flouting British law and order. They were grouped under the broad category of 'criminal tribes' such as thugs etc. Such minorities, castes or tribes, as were crucial to the maintenance of law and order were also listed in the NWP and Oudh Census of 1919 under the instructions of Census Commissioner.¹⁸ Same was true in the case of the Punjab census.

With an eye on utility for the **Raj** rather than progress of Indian society, the British ethnographers-cum-administrators located the large amount of information on caste divisions, caste, rituals etc. which was given in the Army Recruitment Handbooks on each of the 'martial races'. The Handbook on **Garhwalis**, for instance, was largely concerned with identifying the particular subdivisions of **Rajputs** and **Brahmins**, which were amenable to military discipline.¹⁹ Captain A.H. Bingley's study on **Sikhs** and Captain R.W. Falcon's **Handbook on Sikhas for the Use of Regiment Officers**, published in the 1890s, were written with the object of maximum utilization of their fighting potential for the defense of the **Raj** and territorial wars. The army officers' insistence that Sikh recruits must retain their traditional symbols or obtain them through baptismal ceremony upon joining the army revealed their keenness to intensify, religious and caste-consciousness.²⁰ This practice, described in

the Punjab Census 1851, indicates that religion was the primary concern for the colonial administrators-cum-ethnographers and it was given more space and weightage in the compilation of reports and statistical tables. The second and third Punjab Census in 1868 and 1891 respectively are good examples.

The British ethnographers had used a variety of criteria to classify Indian population. According to the Commissioner of Census, 1891, the major aim in prescribing the classification as 'as much uniformity' as the nature of statistics will allow, so that the returns of each province may be dealt with on the same basis.²¹ In the earlier census reports i.e. 1865, 1872 and 1881 **Varna** which covered the Hindus²² throughout India, was used as a principle of classification. In 1891 Census, the **Varna** principle of classification was replaced by the occupational principle of classification. Denzil Ibbetson's ethnological report for Punjab was used as a model.²³ Nesfield has also formulated a theory of origin of caste to justify his application of occupation criterion.²⁴ According to Bernard Cohn, Nesfield's theory reflected the influence of Victorian anthropology, which has emphasized material evolutionism. It fitted well into the intellectual premises of the colonial discourse justifying the British imperialism.

Herbert Risley, the Director of the Indian Census Operations, 1901, dubbed the classification of castes in the 1891 Census as a patchwork classification. Herein, occupation predominates, varied here and there by considerations of caste-history, tradition, ethnic affinity and geographical position.²⁵ Its major defect, according to Risley, was the violation of rules of identity-ritual status, religious community and race. As a result, he proposed the Brahmin-centered classification i.e., the Brahmin being the fixed point in traditional ritual hierarchy and **Kshtriya**, **Vaishya** and other castes stood in relation to him. Risley's scheme of classification²⁶ was given up in the next census for administrative reasons as it had encouraged fierce caste-competition in the first instance. Secondly, it did not provide a suitable grid of classification table, which would help the colonial administrators in constructing an all-purpose conception of caste-ranking.²⁷

Risley has also used the biological criteria to fix the social ranking of a caste. He not only believed in the existence of physical or racial differences but also emphasized their role in determining the social rank and distance between various castes :

If we take a series of castes in Bengal, Bihar, the United Provinces of Agra and Oudh, or Madras, and arrange them in order of the average nasal index so that the caste with the finest nose shall be at the top and that with the coarsest at the bottom of the list; it will be found that this order substantially corresponds with the accepted order of social precedence.²⁸

Risley had developed an elaborate theory to explain the social ranking of caste. In his view, the caste system was the outcome of the encounter between two distinct racial groups. While one represented a light-skinned, narrow-nosed 'Aryan' type, the other represented the dark-skinned broad-nosed 'Dravidian type'. The Aryans, according to this theory, were not only the dominant group but also adopted the practice of hypergamy. This led to the formation of a series of intermediate groups whose social rank corresponded directly with the extent of purity of Aryan blood.

III

Risley's arguments and conclusions, which had used anthropometric data as scientific proof, were challenged by later scholars. P.C. Mahalanbois and G.S. Ghurye dubbed his data and methods as faulty.²⁹ However, D.N. Majumdar, an anthropologist and C.R. Rao, a statistician, produced the most comprehensive investigative study with the help of anthropometrics data about Bengal comprising both West-Bengal and East Pakistan. Majumdar pointed out that his data and conclusion about the clustering of groups according to their social proximity in this region had confirmed his observations for Gujarat and Uttar Pradesh. He concluded that some correlation exists between the order of social precedence in a state or region, and the ethnic constellations based on anthropometrics data.³⁰ It must be pointed out that the afore-mentioned joint study highlighted far more complex nature of relationship than the one, which Risley believed that he had scientifically established. However, it must be conceded that Risley and other like-minded ethnographers felt encouraged by the popular misconceptions about the linkage between physical types and social status. For example, upper castes are universally believed to be light skinned and narrow-nosed and lower to be dark-skinned and broad nosed. Some later studies specifically by Iravati Karve made a detailed comparison between eight Brahmin 'sub-castes' in Maharashtra on the basis of anthropometrics, somatoscopic and serological data into account. Her findings show that there is no necessary relationship between social distance and physical distance and even less surety about the linkage between caste and race. It may be said that the shift from morphological to genetic indicators gives additional support to the view that the relationship between social and physical distance is uncertain and tenuous.³²

In the British ethnographic thinking, the Indian people were readily divided into races or even into clearly recognizable physical types, which were further related with social types, i.e. caste. The colonial ethnographer had manipulated scientific theories and statistical data to reduce Indian society into neat and coherent categories in order to manage the masses. A few of them disapproved of the official attempts to homogenize and regimentalize social world to obtain precise knowledge for control. For example, L. Middleton, the Census Superintendent in Punjab 1921, represented reaction against the prevalent ethnographic thinking :

I had intended pointing out that there is a very wide revolt against the classification of occupational castes; that these castes have been largely manufactured and almost entirely preserved as separate castes by the British Government. They pigeonholed everyone by castes, and if we could not find a true caste for them, labeled them with the name of hereditary occupation. The Government's passion for labels and pigeonholes has led to the crystallization of the caste system, which except among the aristocratic castes was really very fluid under indigenous rulers.³³

Next, it may be pointed out that physical differences are not polarized in India but are spread over a continuum. The population cannot be readily divided into races or even into physical types. The caste system, in its turn, is a system of great complexity and anthropometrics data is not an adequate tool to compose a real picture of India society.

IV

CONCLUSION

At the end of this discussion about the role of the colonial ethnography in the construction of racial, caste or religious identities, three important points emerge. Firstly, identities in Indian society, which had remained amorphous, indeterminate, and capable of apprehension at several levels; caste, sect, dialect and region were conceptualized as religious communities and caste-groups, and categorized and quantified for political purposes by the British imperialists. The colonial ethnographer, who was called upon to assume new responsibilities in view of the increasing resistance to the British empire from the educated middle classes and a few socio-religious organizations, mapped out and fixed the boundaries separating religious communities, caste groups and ethnic elements, along with an exhaustive account of their biological characteristics, social customs and belief systems. The end-product was a coherent, intelligible, though distorted picture of the colonial society, whose members had to be controlled, enslaved, and conditioned to perceive themselves as communal and religious entities, their languages, science, literature and cultural traditions as gifts from the manly intellectually superior, materially advanced and culturally dynamic Europe.

Secondly, the settlement surveys, population censuses, ethnologies, ethnographies and reports on economic and cultural practices (compiled during the colonial period) should not be regarded merely as products of the administrative system but as a corollary to the imperial perception of the relationship between the governability of India and knowledge about its social morphology. In order to enable the administrators and policymakers to gear the imperial system of rule for exploiting the human and natural resources of the subject country, a well-calculated administrative strategy as developed over a long period wherein concept of religion as community and certain castes were deemed crucial and thus worthy of study and analysis from the angle of imperial interests. The colonial state created concepts of religious

community, backward and depressed classes, as well as reservations and communal electorates. While compiling the census reports, the colonial ethnographer converted them into categories which were defined, elaborated and given statistical substance over decades. These emerged finally as fixed social and cultural divisions incorporated in the constitutional structure of British India as illustrated by Government of India Act 1935. Similarly, the numerical majorities in terms of castes became the subject of special official reports because they could be used for managing masses. The minorities such as **Aggarwals and Marwaris**, having intra-regional network, and martial, agricultural and commercial 'races' for their strategic and economic function and 'criminal tribes' as threats to law and order also received patronage, reward or punishment in accordance with their utility in the perception of the **Raj**.

Within the framework of this strategy, the precise knowledge about horizontal and vertical divisions in Indian society along religion and caste lines as well as the system of checks and balances regulating the daily conduct of a culturally alien people, their social relationships and life cycle ceremonies was requisite. The imperial power depended upon its bureaucratic efficiency to operate these controls without conceding substantial political and economic rights to the subject society. This strategic linkage between knowledge and long-term imperial goals of 'hegemony' required the breaking of castes into sub-castes, religious communities into sects, enumeration of the relevant categories with the allowance for religious competition and consequent conversions and their effect on marriages and social customs. The entire data had to be collected, analyzed and marked into separate administrative spaces, provinces, districts and *parganas*. As a part of this exercise, the ethnographer, while constructing well-defined religious and caste identities, standardized names/caste-categories, reduced their number and evolved fixed social-hierarchies, and carved a neat pattern out of the bewildering complex of multi-religious and multi-ethnic society. As the listing and freezing of caste-identities and religious communities was done without any reference to actual reality, the 'invented' colonial society, though more intelligible to the imperial administrator-cum-ethnographer, had been deprived of its flexible cognitive system that could encompass geographical mobility. Thus, the construction of colonial ethnography had done violence to the traditional social system.

Thirdly, it may be conceded that the intervention of the colonial administrator-turned-ethnographer was certainly decisive in the identity-formation of Indians. However, the gradual development of the nationalist discourse and the parallel growth of the liberation struggle indicated that the Indian identity and communitarian consciousness departed from the colonial ethnographer's model for the subject society. Drawn into the process of the transformation of their traditions, modes of cognition, political and social formulations as well as identities, Indians forged a composite national identity, reconstructed their own past and refused to be preserved as specimens in the

colonial ethnographer's museum of an archaic stage in world history by learning to use imported social and material technologies. Raja Ram Mohan Roy, Lok Manya Tilak, M.K. Gandhi, B.R. Ambedkar and Pandit Nehru tried to restructure the image of Indian history and tradition, harnessed cultural resources for mobilizing the people to overthrow the well-entrenched British rule, and redrew the contours of communitarian consciousness befitting the secular ideal in free India. The process of adjustment and accommodation among religious communities after partition and independence can well be the theme of a separate paper.

I would like to add that ethnography, as a tool for neo-imperialists has not lost its relevance even today. This is evident from the current trends in western historiography on Asia and Africa. For example, some American scholars, the Cambridge school of historians, and a number of European scientists have not given up their favourite project of glorifying their political and scientific fitness, intellectual superiority and achievements coupled with the debunking of Asian social systems, their culture, mentalities and epistemologies. Even more dangerous is the vulnerability of the people of developed and underdeveloped countries of the Third world to this propaganda. So strong is the hold of ideological enslavement that these people are easily persuaded to buy self-images, world-views, outdated products and technologies from Europe as well sign Trade-agreements, despite being suicidal to their national interests. The present discussion on the relationship between the knowledge of other societies and their manipulation for imperialist profit underlines the urgency of the decolonization of consciousness through the ongoing intellectual dialogue and its wider dissemination among the educated classes at least.

It may also be pointed out that knowledge of social morphology is increasingly being misused by Asian politicians to keep their countrymen embroiled in communal and caste conflicts. I may end this discussion by rising a question. How do we emancipate our selves from the colonial categories and forge more harmonious identities?

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2. Bernard S.Cohn, 'The Command of Language and the Language of Command', in Ranajit Guha ed., *Subaltern Studies*, vol.iv. (New York, 1985), p. 289.
3. Letter from H.K.Dampier, Additional Secretary to the Government of Bengal, to the Secretary to the Govt. of India, Home Deptt. File No.453, 2nd Februar 1869 (General). Cited in Sekhar Bandopadhyay, 'Caste in the Perception of the Raj: A Note on the Evolution of Colonial Sociology in Bengal' *Bengal Past and Present*, (1985), civ, parts I & II, p. 76.

4. H.H. Risley, *The Tribes and Caste of Bengal*, 4 vols., 1891-1896, (Kolkata 1891), vii.
5. H.H. Risley, '*Ethnographic Enquiries*', p. 31
6. Resolution of Govt. Bengal, Financial Deptt., 30 April 1885, Financial (Miscellaneous) proceedings, March 1887, p. 36 cited in Sekhar Bandhopadhyay, *op. cit.*, (45), 67-68.
7. Michael Foucault, *Ideology and Consciousness* (London, 1979), pp. 5-21, in his discussion of governmentality, Foucault has discussed the evolution of the 'technologies of governing' in Europe in which household, from being a model of state, became a privileged instrument of state control. This served as a unit for the collection of statistics and a point for relating the individual with the state. In the context of the British rule, the introduction of official use of statistics in land revenue administration, later in population census and other reports and records, made the Indian society intelligible and organized into a neat pattern.
8. *Census of India*, 1990, **Report** p. 138
9. C. L. Tupper, *Punjab Customary Law* 1881, p. 46.
10. Richard Sumarez Smith, 'Rule-by-Records and Rule-by-Reports Complementary Aspects of the British Imperial Rule of Law', **Contributions to Indian Sociology**, Vol. 19, no. 1, p. 156.
11. *Ibid.*, 163.
12. *Ibid.*, 169-71.
13. *Ibid.*, 163.
14. *Ibid.*, 173.
15. The first North Western Provinces Census (1853) counted and recorded the number of Hindus and Muslims separately. But the caste and occupation were not added until the next census in 1872.
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- into **Hindus, Muslims and Sikhs, Baniyas** into **Hindus and Jains**, or tribals professing a variety of religions from animism to Christianity; *the latter fact should be recognized as well as the social distinction (italics added)*.
22. For a comparative view see *Census of India*, 1865, 1872 and 1891, Report, especially the chapter on 'Religion'. Apart from Hindus, there were separate categories in the Census for Sikhs, Jains, Aryas, Muslims and Christians. *The Punjab Census Report*, 1891 has also identified the major sects or Orders in each religion and its subdivisions. For example, Hinduism was subdivided into Orders of Yogis and Sanyasis. Islam was subdivided into Sunis, Shias and Wahabis by percentage, and Christians were split into Anglicans, Baptists, Presbyterians, Roman Catholics and unspecified.
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Socio-economic profile of Meendharas of Sunderbans, West Bengal

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INTRODUCTION

In West Bengal Tiger Prawn seeds (*P. Menodon*) are naturally available in large quantities (Bhowmick, 1993; Chakraborti *et.al.* 1987). These are found throughout the year in varying quantities in some of the streams in the Ganga estuary system (Mahapatra, *et.al.* 1993). In recent years brackish water aquaculture has come much in the limelight because of its very high potentiality in production of prawns, particularly of Tiger Prawn (*P. Monodon*). West Bengal's export of fishery products, which almost exclusively is in frozen prawn, has grown to more than Rs. 60 crores in the last decade from a mere Rs. 2.5 crores in 1973 (Bose, 1989).

Present work is done on a group of people locally known as 'meendharas' because they live by catching tiger prawn seeds. Tiger prawns seed are called 'meen'. These people are fisher folk living in the villages of Kamdeb Nagar, Uttar Gopalnagar and Harekrishnapur. The villages are situated on the western bank of Gobodhia, a tributary of the river Saptamukhi and are under the Police Station Patharpratima in the district of South 24 Parganas of West Bengal. Fishing provided the people with livelihood even in the past. At present *meen* collection has become economic mainstay of the villagers, although it only provides for the bare level of subsistence (Ray *et.al.* 2002). Present endeavour is to point out the condition of the people who lie at the very base of the trade in prawn.

Anthropological methodology is followed for this work. Structured questionnaire was framed prior to the visit. Census, information on demography, literacy, occupation, income and other related data are collected by this method. For detailed knowledge interview, narrative and participant-observation methods are followed. Case study is made for in depth understanding of the problems. Information is gathered on the social system, economic condition and the material aspect of the profession of *meendharas*. Special emphasis is given on the method of prawn collection, different implements used, account of profit and loss, health hazard and other problems related to the occupation.

AREA

The area under study is located within Sunderbans. The Sunderbans formed the southern most part of the Gangetic delta. It is a monotonous plain created by the filling up of the Coastal depression by the Pleistocene sediments

(Krishnan, 1960). The area is much traversed by many rivers, streams, rivulets, creeks and channels. Present study area is located within the Hugli-Matla estuarine system, the largest in the world. This is situated between 20° and 23° NL and 88° and 89° EL. The Hugli in east and Ichhamati-Harinbhangha in the west, bound the Indian portion of the Sunderbans: The estuaries carry tidal brackish water. The coastal West Bengal and Bangladesh is engulfed by the Sunderbans, which is famous for its renowned mangrove ecosystem. This large mangrove system is the abode of Royal Bengal Tiger and Sundari (*Heritiera* sp.) tree. It is also the natural habitat for the marine fish of West Bengal.

Three villages, Kamdebnagar, Uttar Gopalnagar and Harekrishnapur are considered for study. The last two villages are in fact extension of the main village Kamdebnagar. These are located in the Pathar Pratima block within the district of South 24 parganas, West Bengal. The district is bounded on the north by the district of Kolkata, on the east by the portion of North 24 Parganas, on the south by Bay of Bengal and on the west by the river Haora and Midnapore district. Total area of this district is 1960 sq. kms. The area is very poor in sweet water supply, so the agricultural return is not sufficient. Creeks, rivers and backwaters crisscross the area. Communication is difficult. Economic growth is retarded in the area. Quite often tidal waves destroy the crop as well as the cultivable land. The saline invasion leaves the soil unfit for cultivation for a few seasons. In order to solve this problem often embankments were raised. One such embankment is even now visible between the village Kamdebnagar and Uttar Gopalnagar. The village known as Kamdebnagar got its name after the name of Kamdeb Prodhan, a rich gentry from Midnapur who leased the land for forest product and brought in labourers from Midnapur for this purpose. The first settlers were Hindus from the communities of Mahishya, Bagdi and Kayastha (De, 1994 : 135).

Houses cluster around an open space in the central part of the villages and are scattered toward the peripheral parts. People live in thatched mud huts. The houses are generally with two rooms. One room is used as store and the other as sleeping quarter. There is only one window in each house. The doors are made of wood. Usually one corner of covered veranda is used as kitchen. The villages are divided into small hamlets but it is not on the basis of caste groups. All the people live in the villages together and all struggle together against poverty. There is no separate space for different castes, even low castes. Nearest town is Kakdwip situated at a distance of 165 km. Nearest Railway station is Kakdwip, 20.5 km. away.

THE PEOPLE

Bulk of the population consists of small farmers, share croppers and landless labourers who had migrated from the drought and famine prone areas of the eastern plateau region. They came from the districts of western Medinipur,

Bankura, Singhbhum and erstwhile Santal parganas. Most of the immigrants were tribal people, such as, the Santals, Mundas, Oraons, Kurmis and Koras. There were also some depressed Hindu caste groups. Sunderbans was populated by the last century. Initially population spread was slow because of hazards like wild animal attacks, snake bites, malarial epidemic etc. (De, 1994).

In the Pathar Pratima block of South 24- Parganas the present 'meendhara' population consists of both tribal and non-tribal groups of people. The villages of the Prawn seed collectors are mainly dominated by the caste Hindus, but there are also some Muslim inhabitants. *Poundrakhatriya, Mahisya, Tantubai, Bagdi* and *Karanga* are the main caste groups of the area. Munda, a tribe also resides there. Though many of them are not from traditional fishing caste, but they have adapted well and got acquainted with the process of catching prawn seeds.

A total of 932 households are there in the three villages. Uttar Gopalnagar is the largest and Harekrishnapur is the smallest. Total population of the villages is 5038. Out of these 1008 persons are actively engaged in 'meen' catching. They belong to 194 households and 535 are male members and 473 are females. The 194 households do not belong to a single caste group. There are 91 Mahishya families, 13 Poundrakhatriyas, 18 Tantubais, 36 Bagdis and 3 families each of Karanga and Munda tribe. Maximum number of *meendharas* belong to Mahishyas and Bagdis.

Population distribution of the 'meendhara' families living in the area show that maximum number of people are within 15 years of age group. The *meendharas* start the job of collecting prawn seeds from a very early age. Children and female members are more proficient in catching *meen*. It is found that the age group involved in *meen* collection has got a long range from 6 to 50 years. Adult male members spend more time in pursuit of land and agricultural labour than prawn seed collection. The children and the female members are constantly in water and are engaged in *meen* collection.

Size of the family depends on occupation. The hazardous situation of *meen* catching is reflected on the family size. The number of small and medium sized families is more, i.e., married couple together with their unmarried children is the general family pattern. Family with one to three members are considered as small and family with four to six members are considered as medium (Shah, 1973). Out of 194 households, 168 households belong to small and medium sized family. In this type of family the father is the main earning member. This type of family got separated from the parent family because of over population and scarcity of land. In these families the husband is the main earning member, but his earning is insufficient to run the family. So the women and children are engaged in 'meen' catching.

Excepting the three Munda tribal families in the area, the 'meendhara' families are from different Hindu caste groups. Among them only two types of marriage forms have been noted, marriage by negotiation and love marriage. It

has been found that negotiation form of marriage is mainly practiced. People of the same caste group are usually selected as marriage partner. Marriages have been found to take place within the same caste group. But marriages between '*meendhara*' family and non '*meendhara*' family are very rare. Practically during last 10 years no such marriage has taken place among the informants in the studied area. The '*meendhara*' families have explained that usually the non '*meendhara*' families are richer people. They do not like marital relationships to develop with poorer sections. Though it has been noticed carefully that in reality, all the non '*meendhara*' families are not affluent people.

There are two primary schools in the villages and one higher secondary school. There is one Anganbadi centre. There are a few voluntary organizations trying to introduce literacy in the village. Education level is very low in the villages. Only one male member is graduate in the whole village. Out of the total '*meendhara*' population 34% did not attend school and are illiterate. The rest have studied upto primary level. Both male and female members have more or less equal proportion of literacy. The females are a little on the lower side.

The villagers are engaged in different occupations, such as, agriculture, day labour, fishing, business and service. The *meendharas* are engaged in both agriculture and fishing. They collect prawn seeds. The male members take to day labour during the lean season of prawn seed collection. In the months of summer, rain and autumn they move from village to village in search of job, mostly as agricultural labourer. The female folk who stay behind go on in pursuit of the *meen* collection.

Occupation is classified into two categories, primary and secondary. '*meen*' catching as primary occupation is found with 98 households. The remaining 50 households practise agriculture, 23 daily labour, 11 service, 7 masonry. Business and deep sea fishing are primary occupations of 2 households for each profession. One household each has rickshaw pulling and quack medicine practice. As far as secondary occupation is concerned 96 households have *meen* catching, 53 daily labour. Rest of the household carry on with service, agriculture, carpentry, business and quack veterenary medicine practice. A total of 18 households have '*meen* catching' as the sole occupation for livelihood.

As mentioned above some of the *meendharas* also practice agriculture. They own some land, though it is not sufficient for providing full sustenance to the owners. In this area there are two types of land, the homestead and the cultivable land. Homestead is higher in elevation than agricultural land. The huts are built on the higher ground to protect these from the tidal wave. The land for each household is not very clearly demarcated. The houses are usually clustered around an open space. The members of all the households surrounding it may use the space. In the kitchen garden chilli, ladiesfinger, eggplant, pumpkin etc. are cultivated. One crop is raised in a year, cultivated during summer months and harvested during autumn. In winter some lands

are inundated and are transformed into prawn raising ground. Immediately after harvest of crops, the *meendharas* become busy with catching prawn seeds and raising them. After the prawns are fully grown and taken out, the field is drained of water and is prepared for cultivation.

The *meendharas* keep cattle, goat, sheep, fowl and duck. Poultry provides sufficient emergency food in the form of eggs. Cattle are for both the purposes of agriculture and milk. Milk is not commercially sold, but if available consumed by the family. The cattle are important for agriculture. They usually lend them for hire during agricultural season.

Meen Catching

Man hunted animals on land. He carried out his search for food in water to gather aquatic creatures like fish. The method of fishing varies in different parts of the world (Ray Chaudhuri, 1980). The most primitive type of fishing was by means of bare hands. This is still in practice in villages of Bengal particularly before the rains when the ponds and waterlogged areas dry up and are in soft muddy condition (Ray Chaudhuri, 1980). As fish slip away and is difficult to catch, man probably devised a trap. When man learnt the use of fibers he no longer confined his materials to wood, bamboo and cane but began to make nets.

Some simple implements are used for the collection of juvenile prawns and seeds from the river. These are net, aluminium pan, rope, enamel tray and bivalve shells. Following are the descriptions of the implements.

1. *Net* : There are two types of nets for the collection of prawn seeds. One type is Hand Operated net, locally known as *Tana Jal*, meaning the drag net. It is priced at Rs. 250/- per net. The *meendharas* make them. The net is made of soft nylon thread and is fixed to a bamboo frame above. Iron sinks lie at the bottom. The other type is Dip net, locally known as *Naukar Jal*, meaning the boat's net. It is priced at Rs. 350/- per net. Maker is the *meendhara*. It is almost triangular in shape. The three sides of the net are bound to three bamboo poles. The apex of the triangle is placed on the gunwale of the boat. These are also attached to the fixed bamboo poles or drums floated for the purpose in the river. A double split bamboo along the base of the triangular shape secures the net.
2. Aluminium cooking pot, locally known as *handi*. It is priced at Rs. 150/- and is purchased from the market. An aluminium pot is used for keeping *meen* alive in saline water.
3. *Rope* : This is made in the village out of jute. This is used for dragging the net.
4. *Dish* : A white enameled iron dish in which the catch is floated for the purpose of segregation of prawn seeds from other fin and shellfish. This may be purchased from the market for a price of Rs. 50/- each dish.

5. *Shell* : These are bivalves collected from the river. The shells are used to pick out the *meen*. The prawn seeds are sorted by floating it on the valve as well.

The fishing implements are important possessions of fisherfolk. On these their livelihood and economy depend. It is found that every family possesses net, shell, pot and dish. Every family has more than one equipment each. Only a few people in the villages own boat. Excepting the boat, usually the implements like pot and dish are purchased with cash. The members of the '*meendhara*' families often weave net. Usually a number of *meendharas* take part in the boat making. They equally share the *meen* caught with the help of the boat they have made together.

The prawn seeds are collected in two ways, either by big dip nets from boat near the mid stream and at the estuaries, or near the riverbank with the help of hand operated nets. *Meen* collection by boat has got a special technique. The handle of the dip net is tied to the boat by means of a thick rope. The three sides of the triangular net are tied to bamboo poles or sometimes to a barrel. The prawn seeds float along the stream and are trapped by the net. Those who collect *meen* by boat are people who are better off. Sometimes two or three persons share the capital and collect *meen* by boat.

The catch from the nets are kept in aluminum pots at first. Later these are transferred to enamel dish or trays. Together with the tiger prawn seeds, other shell and finfish and planktons are caught in the net. The seeds of *Prawn monodom* are segregated. The seed collector keeps the tiger prawns and the rest of the catch is thrown on the embankment. Thus many other varieties of fish are destroyed and the biodiversity is lost (Mahapatra *et.al.* 1995). The *meen* is sold at the markets of Ramganga or Gangadharpur. There are some middlemen who visit the villages and buy the *meen* from the '*meendharas*'. The middlemen sell them to the breeders of tiger prawns. After the prawns have grown into full size the breeders take them out, process them and export abroad.

Availability of '*meen*' varies with ebb and tide. The velocity of water current varies through ebb and tide. This condition is regulated by lunar position. The high tide brings in more catch. The low tide relatively decreases the catch. Quantity of fish increases with the rate of increase of water towards new moon and full moon. The fish follow the wind and water current. During summer the southerly wind brings in more catch. With the northerly wind less amount of catch is found. Summer season is considered as the best time for collection of good amount of prawn seeds.

Occupation of the *meendharas* are full of danger and hazards. Crocodiles and sharks attack them. Continuous submersion in saline water brings in health hazards in the form of various diseases. There is certain amount of fatalism in their world view. They are constantly looking for supernatural support. Ganga puja, worship of the idol of the River Ganga is an important ritualistic

aspect. In the villages under study it is observed in the month of Baisakh that is from the middle of April to middle of May. A fair is held on this occasion, where both the '*meendharas*' as well as general population take part.

Although the *meendharas* continuously collect prawn seeds throughout the year, price of tiger prawn seed varies according to the commercial crop production of adult prawns. The prawn seeds are bought from the collectors and sown in the brackish water aquaculture area which are locally known as *bheris*. These are shallow inundated fields with a depth of about 6'-8'. In fact these are paddy fields. After harvest the fields are inundated with brackish water and aquaculture is carried on. After about six months the fully-grown prawns are taken out. The fields are again cultivated in rainy season with paddy.

A prawn has got a life span of about six months (Ganguly, 1996). The Juvenile Tiger prawn takes its full size within 4 to 6 months. Best season for sowing tiger prawn seeds is winter i.e. middle of December to January. It may continue upto middle of February. Demand for prawn seed is at its peak during winter times, and minimum during September-October.

Economic Sectors of Meendharas

Due to variability and non-availability of exact account of income and expenditure, it has been difficult to assess the actual economic position of the fishermen. The price and availability of '*meen*' being variable at different times, exact revenue from '*meen*' selling could not be calculated. However, an attempt has been made to throw some light on their economic life. '*Meen*' catching is the primary income for approximately hundred families, whereas it is secondary income for about 96 families. The families whose primary source of income in '*meen*' catching are totally dependent on this occupation. They usually cast the net in the river on each and every day, irrespective of the price and the season. In these types of families, both husband and wife and sometimes their eldest son or daughter are also engaged. At least for two to five hours per day they cast their nets.

Out of the 194 '*meendhara*' families, about 18 families are totally dependent on prawn seed collection. The rest 176 families have double source of income. Out of them, 9 families have very little cultivable land; a maximum of $3\frac{1}{2}$ 'bigha'. Their secondary income is from agriculture. Only 6 families are engaged in business activities. Another 9 families earn their living taking up odd jobs in cold storages of potatoes or rice mills in distant districts like Midnapore, Burdwan. About 53 families are engaged as day labour in agriculture or other odd jobs. Only 2 families are earning from carpentry work. There is 1 family, which earns by practising indigenous veterinary treatment for household animals and cattle stock. The rest 96 families have '*meen*' catching as their secondary income and their primary income is from non-marine sources.

The price of '*meen*' is different in different seasons. It is highest during winter season, Rs. 800 to Rs. 1000 per thousand '*meen*'. Whereas during the

summer season and the rainy seasons the price of '*meen*' decreases to very low level. It becomes Rs. 20 to Rs. 100 per thousand prawn seeds. During that time their maximum daily income is Rs. 20 to Rs. 30 a day. Although the influx of prawn is more during this time of the year, the number of collectors is more and risk involved is much higher. This results in less catch for each '*meendhara*'. The price that the fishery owners pay to the middlemen for prawn seeds is almost twice the amount that the '*meendharas*' get. These are sold at Rs. 800 to Rs. 3000 per thousand prawn seeds, which vary with the season. The adult prawns are sold in headless condition in the foreign market. The prawns are sorted according to their sizes and weight. According to the Marine Products Export Development Authority the large prawns are known as U5 and U10. Five headless prawns weighing together as one pound are known as U5. When ten (10) headless prawns together weigh one pound, it is called U10. The price of headless prawns including cost and freight is U.S. \$23.00 (\$1 = Rs. 48.00 approx.), i.e. Rs. 1104 per kg. the price of one prawn of U5 type is almost equal to the price of thousand '*meen*' during lean period of '*meen*' catching.

'*Meen*' catching had never been the traditional occupation for the 194 families. Landlessness and non-availability of service opportunities have compelled them to adapt to '*meen*' catching but many were landless. A few could manage to save some money and purchased small areas of land. This indicates that the economic position of at least a few families have improved over the years. Only 2 families from Uttar Gopalnagar are engaged in sharecropping. The income of the '*meendhara*' families vary between Rs. 600 to Rs. 3000 per month. The source of income is sometimes only '*meen*' catching and is sometimes a combination of '*meen*' catching and other secondary source.

The expenditure pattern of these 194 families revealed that most of the families belong to low-income group within Rs. 1000. They spend more than their monthly income. Many of them even disclosed that they have to borrow money on a rotation basis in most of the months in a year. Families having higher income have some cultivable land. These families have some savings. The savings are normally used for increasing landed properties.

CONCLUSION

The work is done on the '*Meendharas*' of three villages within the Police Station Pathar Pratima in South 24 Parganas. *Meendharas* are a group of people who live by catching tiger prawn seeds called '*meen*'. *Meen* catching is a recent occupation developed due to the demand for tiger prawns in the world market. The tiger prawn has got a worldwide market. Government of India is earning a lot of foreign exchange from the export of prawns to Japan, U.S.A. and other countries. There are several tiers of market, trade and group of people involved in prawn export. On the lowest rung is found the *Meendharas*. But it is the *meendharas* on whom the entire aquaculture rests.

Sunderbans area of West Bengal with its growth of Mangrove forests is a natural breeding ground for tiger prawns. Sunderbans had been brought under habitation since the last century. People from eastern plateau were given lease of forest. People living in the three Villages are both tribal and non tribals. *Meendharas* belong to no specific caste. In the villages studied caste groups following *meen* catching belong to the castes of Mahishya, Poundrakhatriya, Bagdi, Tanti and Karanga. Three Munda tribe families are found. *Meen* catching is at present primary occupation of most of the groups mentioned above. They have also other occupations but daily labour for men folk is main work other than *meen* catching. Agricultural land holding is very small and that too for only a few handfuls of people. People live in smaller families. The reason may be because of lack of landed property. Marriage is practised by negotiation. At present preference is for nuptial arrangement *meendhara* families. Even though primary occupation is *meen* catching all the families have average monthly income below Rs. 1500/- per month. It is the middlemen, the breeder and the exporter who are the gainers out of the trade in Tiger prawn. The *meendharas* face severe predicament from their occupation, even then people are taking up this occupation. It seems that globalisation and emergence of new market complex is giving rise to new socio-economic grouping and the poorest people are largely following such influence for their day-to-day subsistence. *Meendharas* may be considered as a socially recognized group in the Sunderban areas, having been made up of several tribes and caste groups. The grouping is based on occupation and economy.

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Policy and agricultural development : A comparative study of two markets in West Bengal

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Introduction : Peasantry and Market

Despite consistent lack of agreement on the concept of peasantry (Shanin, 1971, p. 12), anthropology defines peasantry as a system of small scale rural agricultural and agriculture related production using the local resources and non-mechanical simple technology. Peasants belong to the subsistence level without having any profit making motive (Firth, 1951, pp. 87-8; Shanin, 1971, pp. 14-5; Wolf, 1966, pp. 1-17). In this system the means of production is owned by a small group of people who are not cultivators by themselves and thereby introduces an asymmetrical power relation between them and the actual cultivator (Wolf, 1966, pp. 1-17; Shanin, 1971, p. 15), Peasants belong to the small-scale community who follows traditional culture as their way of life (Redfield, 1956). The wants of the peasants are limited and controlled by their traditional world-view, ".....part of a static self-perpetuating social system, or that he is culture-bound in his desires as well as his activities." (Firth, 1951, p. 109).

In the history of human career, the development of the market system and towns is associated with the appearance of peasantry (Wolf, 1966, pp. 1-17). The decade long debate between the economists and the anthropologists on the concept of market is yet to be resolved. While economics is more concerned with the production and distribution of goods of both market and non-market economy, anthropology is more involved in understanding and unfolding the social institutions of production and distribution. In economics and economic history, the concept of market has three connotations – 'institutionalised locus of exchange' (market place), 'competitions and conventions' and more abstract non-locational 'total field of goods and services'. In the last sense, market is characterised by the impersonal relations and the motive of maximising the profit (Firth, 1967, p. 5). The peasant market is characterised by the system of redistributing the locally produced commodities defined by the local demands, Yet a few commodities are produced for cash and market exchange, Though the degree of the aforesaid characteristics varies from one area to the other, they are tightly knitted with the national and international economies (Nash, 1971, pp. 161-63). The unprecedented growth of towns and cities is not the result of colonial periods but the advent of 'mercantile or industrial capitalism' (Pearse, 1971, p. 72).

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Market and Beyond

Market usually denotes a place of transacting commodities produced by the local communities using primary resources available in the region. Market can be held daily at a specified set of hours or at a regular period of interval where the transaction takes place against a medium usually known as money. Non-monetary transaction is barter, which is restricted among the so-called tribal groups residing in the remote areas. In West Bengal, particularly in Southwest Bengal, several markets are there that practise both the barter and cash transaction for the tribal groups who participate in those markets. This feature is the sign of gradual development of the market network and the changing nature of production and transaction in the area. The social characteristics of peasants and traders are obviously different. Peasants are least concerned with the market principle since their primary interest is around the land and production. They sell their product in the market as quickly as possible to return to their land. On the other hand the traders purchase the commodities to sell at other places or markets. So, their prime concern is the market principle and mercantile capital (Belshaw, 1969, p. 39). Over the decades, the notion of market is changing not only in the big Indian cities but also in the areas, which are predominantly rural. Market is no more a place, neither it requires a particular location where the buyers and sellers can regularly assemble nor they require meeting each other face to face to exchange the commodities against money. A letter or a simple phone call may be enough to transact the deal between the buyers and the sellers while bank takes the responsibility of transferring the money. Apart from the meaning of *market as a place* or locus of transaction, market also means *principle* that concerns the formation of wages, prices and profit (Gregory, 1999, pp. 931-36). Marketing, marketability etc. is again related to the said principle. While the former means the launching of new products in a region, the second means the saleability of product. Introducing a product in a region is associated with the launching of a fresh set of advertisement electronic, print or otherwise to make the consumers aware of the product. To increase the saleability of products, the producers craft their advertisement cleverly to increase the want of that product among the mass or a target group of the population identified on the basis of income, social status etc. Therefore, market is a unique place to feel the pulse of continuously changing society.

The market transaction or exchange may be vertical or horizontal (Gregory, *ibid*). Vertical transaction is involved with a system of hierarchy where the local producers occupy the lowest position and the products gradually move upward to a monetarily powerful businessman who distributes the products horizontally. This type of complex market system develops merchandise wealth or capital, which is controlled and defended by a group of specialist tradesmen. Products changing hands from sellers to buyers indicate

the horizontal movement of the products in space. Thus markets simple or complex, offer a space to various categories of people to interact and thereby form a cultural practice.

In the created space of the transaction, the traders of various kinds occupy an important position. Permanent shopkeepers transact their daily business from a fixed place while the hawkers are mobile and belong to the margins of the market system. On the basis of the permanent and mobile loci of the traders as well as core and fringe of the market place, the marketable commodities or objects have economic and social values. All of the food commodities are not treated as having equal value, for many food items sold in the market (including restaurants and hotels) are associated with economic status. Life sustaining daily consumable articles apart, a lot of commodities is identified as durable consumer items in the monetised economy and complex hierarchical society : So, the objects sold in the market are not merely the commodities of use value but are hierarchical social objects. Their hierarchy is imprinted by the society that value consumption more than its people and their relations.

Pattern and Development Policy

In anthropology, the term pattern indicates the regularity of the human behaviour of any society at any space and time. The observation of the 'pattern' depends upon the methodology one adopts for collection of data, analysis and interpretation. Anthropology's concept of economies (both tribal and non-tribal, traditional and modern) in India has been constructed on the basis of field experiences acquired during India's pre-independence and independence period. The constructed concepts end up in finding the 'structure' of patterned behaviour for the ethnographers who intend to find out the 'regularity' in pluralistic cultural conditions of India.

For this reason, the ethnographers and anthropologists have spent much time on understanding the role of caste system in maintaining the economy and social organisation of the villages. The regional variability is ignored in these studies. The struggle of the people, their decision making capacities as well as the factors that force them to decide and appropriate particular actions are reduced to 'structure.' In short, the whole human enterprise is reduced to 'objective structure'. As a result, anthropological knowledge though rich in microscopic detail, falls short of formulating the developmental policy. In a similar vein, policy as a means for appropriation of the adopted decision(s) among the possible(s) in order to achieve a particular or a set of goals falls short of expectations. For it draws its inspiration from the observation of so-called-pattern i.e. the regularity of people's social behaviour in the domestic sphere and the incoming economic and political forces at the global level. It is no wonder that the implementation of policy would remain skeletal and lacks the flesh and blood of it Wrongful implementation of any public policy

regarding the developmental initiative is bound to affect the whole population or a part of it.

Cultural anthropology's role in the development studies is semiotic and largely remains unexplored. Anthropological exercise in the domain of policy and development remains at the level of 'description' rather than 'prescription'. While policy is only prescription, and definitely not planning and programming of development, anthropological study of policy is likely to be the semiotic analysis of the meaning of policy statements. Instead it only describes the empirical situation to generate heuristic or theoretical models and hardly concern the model of development (Apthorpe, 1985,88-101). Dual concern of anthropology and development policy is somewhat tricky. Redclift issues warning. "In reproducing 'authoritative conclusions' that policy agencies seek, anthropologists inevitably compromise their skills and interests in the cause of the greater good.. This compromise is a challenge which anthropologists ignore at their cost" (Redclift, 1985, p. 199). To keep up the ethics of anthropological practice, justifiably one can identify the problems faced by a local society due to impact of developmental measures and communicate the learnt lesson to the policy makers for the benefit of the people (ibid. p. 202). This article is not aimed at making any critical anthropological discourse on the development policy and planning but to point out the importance of understanding the regional pattern of agricultural practices and consequent development of market.

During the British rule in India, The Royal Commission on Agriculture was instituted in 1926, to increase agricultural production. The Commission made various recommendations that includes agricultural research, crop production, animal husbandry, forestry, fisheries, co-operation, village development, agricultural finance etc. After independence, National' Agricultural Policy was formulated in 1947-48 to bridge the gap of the regional imbalances in food production. The matter was put to the concurrent list of the states, several commissions were set up, and special emphasis had been given to agriculture and agriculture related matters from the First to Fifth Five year Plans (1950-51 to 1979-80), While special attention was given to the means of agricultural production starting from irrigation to high yielding variety of seeds and mechanisation of agriculture, marketing of the agricultural produces escaped the policy. Policy of marketing is very important in the sense that most of the agriculturists are marginal landholder and have no avenue to escape the network of the big traders to sell their produces against proper price. In the objectives of the Agricultural Programme during Sixth Five-year Plan, marketing has been mentioned. ".....(f) to safeguard the interest of both producers and consumers by attending to the needs of production, conservation, *marketing and distribution* in an integrated manner" (Kashyap, 1990, pp. 13, italics added). We would see later how market is important to safe guard the

interest of agricultural development, which can ensure the interests of both producers and consumers particularly small-scale agricultural producers.

Study Area

The regional market Silda in the district of Medinipur is located at a distance of about thirty kilometres from the sub-divisional headquarter Jhargram. Historically the area belonged to the tribal communities and later Hindu caste groups of middle order started to settle here from the early period of British rule. Though, the local history of the area is yet to be reconstructed it is known that the British government used to auction the weekly market of agricultural produces of Silda to earn revenue prior to independence, the local big landowners earned fortunes by trading paddy with other markets of the district and adjacent states. After independence, this multi-caste village and its weekly market of agricultural products have gradually been transformed into a market town within a span of three decades. The market is well connected with Jhargram, Kolkata (Calcutta) and other towns of Medinipur, Bankura District and adjacent state of Bihar.

The municipal market of Paschim Choubaga draws its name from the name of adjacent village and is located in Dhapa area of eastern Kolkata, which is famous for garbage farming. In 1864-65, Dhapa Square Mile as it was known at that time was founded by the then Calcutta Municipal Corporation to dispose of the garbage of developing commercial town of Calcutta. After repeated failure of the corporation to develop the area for garbage farming, it was leased out to private entrepreneur in order to earn revenue. The entrepreneur then brought the ancestors of present day cultivators from Teor and Kaora caste groups to dump the waste of the city at Dhapa who eventually turned out to be garbage farmers. Some 30 to 40 years back the vegetable producers started to sale their produce from this very place. Later, this place grew into a market and recently a municipal one. The market is held daily in the afternoon that turns out to be an assembly of traders from local villages. Though a number of permanent shops are there to sell mostly non-edible items, most of the traders sell agricultural produces of which vegetables occupy prime importance. Conveniently located by the side of Kolkata metropolitan by-pass road that connects Kolkata with South Twenty-four Parganas district, the market is regularly attended by the middlemen who purchase vegetables in bulk quantity. Later they supply vegetables to different important markets of Kolkata, various districts of West Bengal and adjacent states. Therefore, the traders who are producers too, get instant bulk buyers to transact their items immediately against cash.

Fieldwork has been done at Silda and Pashchim Chowbaga markets in 1998-99 and 2003 respectively. The data have been collected through the first hand fieldwork employing field assistants. To collect the quantitative data a

structured but open-ended “schedule has been introduced to interview a group of 63 shop owners representing the different caste groups and trading enterprises from Silda market, This sample group has been selected from about 350 shops having permanent structure in the market following the technique, Which is partly purposive and partly based on availability. The same schedule and procedure have been introduced to interview 54 traders from Paschim Chowbaga market. Since the market is attended by the local producers of vegetables from adjacent villages, the permanent Shop owners who are considerably much less in number have been avoided. The reason for selecting the traders having no permanent stalk or shop is that the garbage farming in Dhapa area is actually done by low caste groups Teor and Kaora who are not traditional agriculturists. These vegetable cultivators themselves sale their product to the said market. The size of the selected shop owners may not be adequate to infer about the social and economic processes of the market, however, they may indicate the trend of it.

From agricultural field to market

The village of Silda has developed into a multi-caste one for its prosperity in agricultural production. Unlike other villages of West Bengal and elsewhere, the village is numerically and economically dominated by the *kamar and gandhavanlk* caste groups since they own large plots of agricultural land. Trading of surplus production has earned them a fortune. Development of transport network has offered them to venture into new trading sector. It appears from **table 1** that the *gandhavanlks* of Silda have taken the opportunity of diverse trading and followed by the *kamar, brahman* and *tell. Sarnavanlk and dhopa* caste groups are still pursuing their traditional knowledge and skill and successfully entered into the market. The case of the *sarnavanlk* unveils the fact that they jealously guard their trading secret. It may so happen that they control the capital related to gold merchandise in the region. This sort of multi-caste situation is not found in Pashim Choubaga market for the cultivation in the area is the monopoly of the low caste groups *Teor* and *Kaora*. Similarly, **table 2** is concerned With Silda market because the vegetable traders at Paschim Chowbaga market relate their enterprise as small one. The table shows a relationship between traders, perception about the volume of their enterprises and family structures. Among the 63 traders, 53 claim their enterprise as medium one. Among those 53 traders; 34 traders belong to the nuclear families. This fact is doubly significant for the reason that living in nuclear families curtails the expenditure for family maintenance and thereby increases the possibility of investing more money into trading. Living in nuclear is also advantageous for the traders since the ownership in extended families is divided among the male members. For the economically well off families, 'staying nuclear would be more urban in character. In rural areas, on the other hand, living in extended families is a little more advantageous for the poor because

they can share the economic burden of the families jointly. Secondly, extended families usually control a vast amount of landed property to support themselves. In this case, maximum traders living in extended families indicate that they want to retain control over landed property. This fact suggests that agricultural capital in the area has been separated from the trading capital. It also means the emergence of a new form of capital market which is developing in the area. **Table 3A** shows that out of 64 traders at Silda market, 21 enjoy the ownership of the enterprise individually and belong to the nuclear family. It simply indicates the advantage of the individual owners staying in nuclear families because they do not have to share the profit with other siblings. In case of Paschim Chowbaga market, the vegetable growers of the area sometimes appoint the local people to sell out their product in the market. Most of the times, appointed sellers are women labourers in their vegetable fields who are paid in cash instantly. This is considered as extra income and has a considerable demand in the area. The 'other' in **table 3B** belongs to this category. This table also reflects that most of the individual owners belong to extended family. This fact confirms the previous statement regarding the advantage of staying in extended family for the low-income group. **Table 4A** indicates the ways of procuring capital to start the enterprise. The numerals will not correspond to the total number of traders interviewed, for, quite often the traders are pulling together funds from more than one source. Nearly half of the traders combine different funds to venture into the trading business. But almost all the owner traders (numbering 42) at Pashchim Chowbaga market have invested earnings from agriculture into trading. As they are marginal farmers, they have no other source of fund to invest (**table 4B**); The stunning of all fact is that the traders of Silda market are also investing their earnings from agricultural sources into the trading. This shows that they are not interested in purchasing agricultural land (**table 5A**). The withdrawal of fund from the field does not suggest agricultural development but the transformation of agricultural capital into the trading one. Eventually this will lead to social change the sign of which is already visible in the area. The marginal farmer of Dhapa area has started trading in order to earn extra money for family maintenance (**Table 5B**). Apart from spending the profit for family maintenance, which is obvious for both the cases, a large number of traders are investing their profit with the Bank (**table 5A & 5B**). It may also indicate that these traders want to protect the capital from the risk of losing it. Another reason also warrants attention. Bank investment is required to meet the matrimonial expenses. Increasing matrimonial expenses add to both worries and social status.

Why does land comes into the market? Bailey seeks the answer in the context of his study in Orissa. He finds that since past one hundred years in the villages in Phulboni district of Western Orissa, the immigrated population



has increased significantly. The immigrants have commenced trading enterprises and thereby created mercantile capital to invest into the purchasing of land. While the local landowners have been selling out landed property to start business enterprises to take the advantages of the new economic opportunities or just turned into labourer. Bailey claims that this situation has been developed everywhere in India and particularly in aboriginal areas (Bailey, 1972, pp. 47-93). Bailey's observation may have validity in case of Orissa and other tribal areas. But in our case the situation appears to be a little different. It is true that the Hindu caste people have immigrated into this predominantly tribal area but that too happened nearly two hundred years back. After acquiring landed property the big landowners have ventured into trading to increase both agricultural and mercantile capital simultaneously. However, such mercantile capital is basically agricultural one. It is not that the transformation of agricultural capital into mercantile capital has become complete; rather a section of traders who are also landowners, are investing their profit into purchasing land. Another section of landowners has turned out to be full-fledged traders selling out landed property. This may be due to dual economy in vogue in our country as Belshaw has pointed it out. In the pluralistic society with dual economy, there remains the traditional peasant economy in its theoretical terms in one sector, which wants to satisfy the social needs, security and continuity while it remains unconcerned about the international situation, maximisation of profit and optimum exploitation of available resources. The other one is commercially more sophisticated, with motive of maximum use of available resources in order to maximise the profit. In short they work according to the principle of capitalism (Belshaw, 1969, pp. 95-6). Again this observation can not explain the present case study not only for the reason that Silda traders have not achieved that level of capitalistic acumen but also there remains a chance of intermediacy always. Consolidating wealth by avoiding the stiff competition from the market does not show the sign of capitalistic mental frame. To remain within the fold of peasantry solely or to become traders and entrepreneurs depends upon the individuals. Economic policy and developmental planning apart, they finally *decide* what to do among various other possibles offered by their social conditions. Otherwise it can not be explained. One trader need not invest money to build house or meet the matrimonial expenditure during his daughter's marriage, unless he is obliged by the social forces to do so. Social obligation and emerging new concept of status affect both traders and agriculturists alike. To conclude the section, it can only be said that the present research is not aimed at making a critique of Belshaw and Bailey's contentions. For the collected data is not enough to do so. It only points out that making policy on agricultural development without considering the social conditioning of domestic and local markets hardly reaches the ground level reality.

TABLES :

Table 1 : Table showing the caste affiliation of the traders at Silda market.

Sl. No.	Caste Groups	Traditional Occupations	Categories/ Types of Shops	No. of Shops
01.	<i>Brahman</i>	Teaching & Learning of Sanskrit Texts, Priestly Works	Engineering works, Confectionery, Furniture Grocery, Oil/Flour Mill	6
02.	<i>Chasa/ Sadgop</i>	Agriculture	Furniture, Medicine, Confectionery	3
03.	<i>Vaishnav</i>	Agriculture	Confectionery, Grocery, Photography.	3
04.	<i>Tanti</i>	Weaving	Tailoring	1
05.	<i>Goala</i>	Production and seling of Milk	Confectionery, Engeneering works.	2
06.	<i>Gandha-vanik</i>	Grocery	Trading of agricultural produce, Confectionery, Furniture, Press. Electronic goods, Medicine.	16
07.	<i>Sarna-vanik</i>	Jewellery works	Jewellery works	4
08.	<i>Dhopa</i>	Washing clothes	Laundry	1
09.	<i>Kumar</i>	Blacksmith	Auto repairing, confectionery Shoe, Furniture, Betel-leaf.	7
10.	<i>Teli</i>	Production and selling of edible oil	Trading of agricultural produce, Tailoring, Grocery, Hardware & Cement, Electronic goods.	6
11.	<i>Tambuli</i>	Production and selling of Betel-leaf	Grocety, Oil/Flour mill, Hardware.	4
12.	<i>Bhunia</i>	Agriculture	Auto repairing	1
13.	<i>Bauri</i>	Basker making and selling	Furniture	1
14.	<i>Jugi</i>	Agriculture	Confectionery	1
15.	<i>Sunri</i>	Production and selling liquor	Medicine, Furniture	2
16.	<i>Kurmi</i>	Agriculture and wage labourer	Auto repairing, Tailoring, Shoc shop	3
17.	<i>Behari</i> (Non-Bengali Hindu)	Not known	Enginnering works	1
18.	<i>Santal</i>	Agriculture	Tailoring, Photography	2
Total				64

Table 2 : Table showing the relationship between scale of enterprise and family structure traders at Silda market.

Sl. No.	Caste groups	Scale				Family structure			
		S	M	L	T	N	E	O	T
01.	<i>Brahman</i>	–	6	–	6	2	1	3	6
02.	<i>Chasa/Sadgop</i>	2	1	–	3	2	–	1	3
03.	<i>Vaishnav</i>	–	3	–	3	2	–	1	3
04.	<i>Tanti</i>	–	1	–	1	–	–	1	1
05.	<i>Goala</i>	1	1	–	2	1	1	–	2
06.	<i>Gandhavanik</i>	1	14	–	15	6	4	5	15
07.	<i>Sarnavanik</i>	1	3	–	4	1	1	2	4
08.	<i>Dhopa</i>	1	–	–	1	1	–	–	1
09.	<i>Kamar</i>	1	6	–	7	4	1	2	7
10.	<i>Teli</i>	–	6	–	6	5	1	–	6
11.	<i>Tambuli</i>	1	1	2	4	2	–	2	4
12.	<i>Bhunia</i>	–	1	–	1	1	–	–	1
13.	<i>Bauri</i>	–	1	–	1	1	–	–	1
14.	<i>Jugi</i>	–	1	–	1	1	–	–	1
15.	<i>Sunri</i>	–	1	–	2	1	1	–	2
16.	<i>Kurmi</i>	–	3	–	3	2	–	1	3
17.	<i>Behari</i>	–	1	–	1	1	–	–	1
18.	<i>Santal</i>	–	2	–	2	1	–	1	2
	Total	8	53	2	63#	34	10	19	63#

Note :

* Scale — This term indicate the shop owners perception regarding the volume of their trading enterprises. S – Small; M – Medium; L – Large; T – Total number of enterprise.

** Family structure is based on anthropological categories of family. N – Nuclear; E – Extended; O – Other.

Information from one shop owner could not be obtained.

Table 3A : Table showing the relationship between the family structure and the nature of ownership of the trading enterprise at Silda market.

Family Structure	Ownership		
	Individual	Family	Total
Nuclear	21	12	33
Extended	6	5	11
Others	12	8	20
Total	39	25	64

Table 3B : Table showing the relationship between the family structure and the nature of ownership of the trading enterprise Paschim Choubaga market.

Family Structure	Ownership			Other	Total
	Individual	Family	Other	Individual	
Nuclear	6	—	—	8	14
Extended	24	8	2	6	40
Others	2	—	—	1	3
Total	32	8	2	15	57

Table 4A : Table showing the avenues of procuring capital for trading enterprises by Silda traders.

Sl. No.	Ways of procuring capital	Number of Enterprises
1.	Selling off ancestral property	1
2.	Selling off agricultural land	6
3.	Income from agricultural land	26
4.	Bank / Co-operative loan	32
5.	Matrimonial relations / Dowry	9
6.	Accumulating salary from service	39
7.	Pulling together different funds	36
8.	Other sources	4

Table 4B : Table showing the avenues of procuring capital for trading enterprises by Paschim Choubaga traders.

Sl. No.	Ways of procuring capital	Number of Enterprises
1.	Selling off ancestral property	—
2.	Selling off agricultural land	—
3.	Income from agricultural land	40
4.	Bank / Co-operative loan	—
5.	Matrimonial relations / Dowry	1
6.	Accumulating salary from service	—
7.	Pulling together different funds	—
8.	Income from non-agricultural sources	3

Table 5A : Table showing the way the traders of Silda market spend the profit earned from the enterprises.

Sl. No.	Ways of spending profit	No. of shop Owners
1.	Family maintenance	61
2.	Purchase of agricultural land	0
3.	Invested with other business	5
4.	Invested with bank	44
5.	Building of new houses etc.	22
6.	Purchase of durable consumer goods	7
7.	Matrimonial expenditure / payment of dowry	1
8.	Combinations of the above	24

Table 5A : Table showing the way the traders of Paschim Choubaga market spend the profit earned from the enterprises.

Sl. No.	Ways of spending profit	No. of shop Owners	Others	Total
1.	Family maintenance	40	15	57
2.	Purchase of agricultural land	2	—	2
3.	Invested with other business	1	1	2
4.	Invested with bank	22	5	27
5.	Building of new houses etc./ Purchase of durable consumer good	3	—	3
6.	Matrimonial expenditure payment of dowry	1	7	8
7.	Combinations of the above	—	—	—

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Rituals and Social Structure : A Study on a Village of West Bengal

MANIBRATA BHATTACHARYA

In anthropological literature rituals have been defined as the social aspect of religion. Rituals dramatize the abstract tenets or religion, the content of religion concrete and recognizable. Though rituals are rule-bound public events, they establish thematic relationship between the mundane and the spiritual levels. Durkheim, Radcliffe-Brown and many other structural functionalists studied the rituals as manifestation of society's worship of itself. They reached such conclusion against the notions of evolutionary perspective and psychological bias of Spencer, Tylor and Frazer. Depending on Frazer's writing Freud considered rituals to be the result of conflict between instinctual demands and approving official demands. Mallionowski's psychological approach is different than that of Freud. Mallionowski saw rituals as essentially an emotional response and "arise and function in situations of emotional stress"; it is a part of human condition and indispensable pragmatic figment without which civilization cannot exist (1963 : 336). Leach (1968) has proposed to study rituals as an actor-centered perspective which is an aspect of culturally standardized actions. Roy Rapport (1968) argues that there is an intrinsic functional link between war activities and rituals cycle of the Tsembaga. However, one of the main issues that is concerned with rituals and rituals symbolism can be stated that they are ambiguous because they are representations of social world that is contradiction ridden. And for such nature of contradiction the message of ideology cannot be maintained simply as a statement in the world of human experience.

Eriksen (1995 : 203) precisely noted "rituals simultaneously legitimate power..... important vehicle of ideology, and give the participants emotional experiences. Another perspective focuses on the ability of rituals to give people an opportunity to reflect on their society and their own role in it". In this respect studies of Turner (1969), Geertz (1973), Gluckman (1982) and Maurice Block (1986) are important.

Social structure of a village and rituals

Recent anthropological studies on Indian Society give emphasis on the village as a unit for analysis. To quote Mandelbaum "A village is far more than a locale, more than just a collection of houses, lanes and fields. For a villager it is a prime social reality" (1968; 40). The social reality of the village is also supported by Beals (1968), Carstairs (1961), Dube (1955), Gough (1955), Karve (1958, 83) Lewis (1958), Mayer (1960) and others. But this stand is doubted by Dumont and Pocock (1957) who do not regard the study of village

as either corporate group or as a useful unit for analysis. The present author thinks that structural study of a village can be made through ritual analysis. The study of rituals will also enable us to trace certain social relations in different structural units of the village (Bhattacharyya and Datta 1973). Here the term ritual is used for the forms of the formal actions which have their validity of efficacy in itself through mystical order (Firth, 1967 : 73) and the actions are primarily religious (Wilson 1954 : 228-43). The study unit is the village Ambikanagar which lies on the eastern bank of the Kangsabati river in the district of Bankura of West Bengal. This region of West Bengal is semi-arid and dry, lies adjoining to the natural region of Chotanagpur plateau. The village was the seat of a local Raja who had relation with other local Rajas of the adjoining area—Manbazar, Khatra, Raipur, Jhargram and even with the Mallah Dynasty of Bishnupur. All the villagers claim themselves as Hindus and are stratified into upper, intermediate and low *jatis* (Table-1). The village is named after the *Sakta* goddess Ambika who is represented by a stone

TABLE – I
Structural pattern of the village Ambikanagar

Caste/community	Occupation	Percentage of family	Percentage of population
UPPER CASTES		29.29	26.40
Brahmin	Landholding priest	7.57	12.92
Khatriya	Landholding	2.27	2.40
Kayastha	Landholding, trade, service	2.78	3.56
Vaidya	Service	16.67	7.52
INTERMEDIATE CASTES		31.82	36.93
Vaishnab	Devotional singer	2.02	2.00
Modak	Landholding confectioner	13.89	17.68
Kumar	Potter	4.80	6.11
Malakar	Florist	0.25	0.26
Napit	Barbar	1.26	1.32
Subranabanik	Goldsmith	9.35	9.36
Chhutor or Korga	Carpentry	0.25	0.20
LOW CASTES AND OUTLYING COMMUNITES		38.89	36.67
Rajak	Laundering	0.5	0.55
Keot	Fishing	5.56	5.26
Bagdi	Agricultural Labourer	1.26	1.55
Dom	Agricultural Labourer	1.01	1.10
Hadi	Comb marker	5.56	7.07
Bauri	Agricultural Labourer	25.00	21.14
TOTAL		100.00	100.00

TABLE -- II
RITUALS ORGANIZED SEX-AGE GROUPWISE

Rituals	Time	Place	Functionally connected	Ritual specialist	Participants	Aim and motif	Brief Description	Remarks
A1 Ijal-Pinjal	In the late evening on the day of Kali Puja in the month on Kartik (November)	On the village street	Health and to cultivate in-group sentiments		Male boys of 6-12 years	Recreation	Seaveral boys in group rotate a glowing fire balls made of lattered clothes and soaked in upper and kerosine. It is attached at the intermediate tip of an iron wire and the free end is held in the grip. In each group one boy becomes the chief and others remain spectators and watch the situation. The boys enjoy the scene and often shout Ijal-pinjal following the chief actor.	Usually by the boys of the upper and intermediate castes.
A2 Chonk-chhenda	At night on the eight day of newmoon in the month and paddy of Bhadra (Aug.-Sept.)	In the village (gardents of the neighbours in the month and paddy fields)	Recognition of adulthood		Male boys of 14-29 years	Recreation	The youngsters in group go out at night to steal something edible from neighbours' only houses as well as from their observe gardens. On this occasion specially fruits and green vegetables are the main alluring objects which they consume collectively.	Caste Hindus only observe this ritual.
B1 Itu-puja	Every day in the month of hold	In the house-	Fertility		Unmarried village girls	Recreation	The village girls in separate Present groups go out to among the	

[Contd. N. Page]

TABLE - II (Contd.)

Rituals	Time	Place	Functionally connected	Ritual specialist	Participants	Aim and motif	Brief Description	Remarks
	Agrahayan (Nob.-Dec.)				of 6-12 years		collect several varieties of grass. The seedlings of different grasses are transplanted in an earthen bowl supplied by the village potters. Under the supervision of mother girls of each household sprinkle water and sing the associated songs.	cast Hindus
B2 Mongoler-puja	On each Tuesday in the month of Jaistha (May-June)	In the household	Welfare of the family	Brahmin priest	Married women of 16-40 years	Welfare of the family	A family is selected mutually and the married women assemble there to observe the ritual under the supervision of a Brahmin priest. Fasting is observed by the women till the worship is completed.	Women belonging to the Caste Hindus observe this ritual.

TABLE - III

RITUALS OR FESTIVALS ORGANIZED FAMILYWISE

No. Festivals/Rituals	Time	Place	Functionally connected with	Ritual specialist	Participants	Aim and motif	Brief Description	Remarks
1. Rohini : a sacred day	(2) Jaistha (May-June)	(3) House and unprepared	(4) Agriculture	(5) —	(6) Family members	(7) To increase the fertility (family) remains in fast.	(8) One adult male member	(9) On this occasion

[Contd. N. Page]

TABLE - III (Contd.)

No. Festivals/ Rituals	Time	Place	Functionally connected with	Ritual specialist	Participants	Aim and motif	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
for fertility of the seeds		paddy field				of the seeds	After bathing he goes out in the field with some seed gra- ins and scatters (sowes) seed grains and collects some loose soils from the field. He comes back with some seedgrains which are mixed up with those seed-grains which would be used in appropriate time. The collected earth is supposed to have supernatural power and is used as medicine at the time of sowing. it is mixed up with seed-grains and thus provides some magical power and are used to increase the resistance against destructive element's when sown.	low castes worship the snake goddess <i>Manasa</i> . Land-less people collect earth form the field and the earth is supposed to have curative property.
2. Ambubuchi: a sacred period when menstrua- tion of the earth is occurred.	Ashar (June- July)	House and unpre- pared paddy field.	Agriculture	—	Family members	To observe the fertile condition of the earth	Family members take uncon- mon food stuff instead of reg- ular food items in connection with meal. Ploughing or any other agricultural activities are forbidden for this period. The duration of the period is 7 days.	Low castes observe this day by worshipping <i>Manasa</i> .

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TABLE - III (Contd.)

No. Festivals/ Rituals	Time	Place	Functionally connected with	Ritual specialist	Participants	Aim and motif	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
3. Khaidheyara: ritual eating of fried paddy and curd	Shravana (July -August)	House	Agriculture	Brahmin priest (by caste Hindus)	Brahmin priest and family members	For healthy growth of the seed- lings and to protect from snake bit- ings and for longhi	In connection with trans- plantation of the seedling this ritual is observed. The villagers take uncooked food particularly with molasses. On largely parched paddy and this occasion wors- hip of <i>Manasa</i> is done in each house-hold. Besides, commun- ally worship of <i>Manasa</i> by a Bauri priest is also held in the village and most of the villa- gers contribute money to meet the expense of the communal festival.	Low castes either observe communal worship of <i>Manasa</i> where priest is a caste fellow or they do not appoint Br- ahmin priest but the sen- ior member of the family wor- ships her.
4. Goalpuja : Worship of the goddess of prosperity	Bhadra (Aug- st-September)	In the Cow- shed	"	"	"	For prosp- erity of the family and bumper crops	The Brahmin priest propitiates the goddess of prosperity represented by an idol carved in wood of jackfruit. The sac- red hymns are chanted, food including fruits, parched and fried paddy, rice, green vegetab-	Those who have landed property & cows observe this ritual.

[Contd. N. Page]

TABLE - III (Contd.)

No. Festivals/ Rituals	Time	Place	Functionally connected with	Ritual specialist	Participants	Alm and motif	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
5. Lakshmi Puja : Wor- ship of the goddess of prosperity	"	In the living room	"	"	"	"	les with stalks are offered and sacrifice of green vegetables are also made in front of the idol. On each Thursday by appoin- ting a Brahmin priest worship of the goddess is performed Recitation of sacred verse (<i>panchali</i>) sacred hymns, offer- ing of different food articles are made to the goddess.	The caste Hindus generally observe this ritual.
6. Jiur-Puja : Worship of the paddy plants as the goddess Lakshmi ber)	Aswin (Sep- tember-Octo- ber)	In the paddy field and in the house	"	"	Family members	For good harvest and protection of the cereals	Three leaf packets each containing gold, silver, grasses, leaves, flowers fruits, tubers, food grains oil-seeds and sweets are fastened at the end of three reeds separately. After taking bath one member (male) of the family goes to the paddy field with three reeds when and packets; coming in the field one of the reeds with the packets is fixed into the earth and is fastened with a paddy plant and thereafter he pours down milk and water on the	It is performed by the caste Hindus and those who have landed property, low castes observe do not perform elaborately as done by caste Hindus.

[Contd. N. Page]

TABLE - III (Contd.)

No. Festivals/ Rituals	Time	Place	Functionally connected with	Ritual specialist	Participants	Aim and motif	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
7. Lakshmi- Olakshmi puja : Wor- ship of the goddess of prosperity and misfor- tune	Kartik (Octo- ber-November)	In and out- side the room	Prosperity and Agriculture	Brahmin priest	Brahmin priest and family members	For welfare of the family	<p>root of the plant He collects handful of grasses using a sickle from the field and comes back in the house with two reeds and packets. At the time of entrance one female from the house asks him three questions about what the goddess told him in the field and he replies separately to each question.</p> <p>On the new-moon night when Kalipuja is performed most of the families (Caste Hindu) observe this ritual. Here both the goddesses of prosperity and misfortune are propitiated with magical rites. At first, goddess of misfortune is invoked and then ritually driven away from the household and there- after, the goddess of prosperity is invoked, propitiated by food offering and installed in the house.</p>	Not found among the low castes.
8. Harikaran : removing	"	House tank and rejected	Ancestor worship	"	Family members	"	The house is thoroughly cleaned with cow dung solution; among caste	Not found among caste

[Contd. N. Page]

TABLE - III (Contd.)

No. Festivals/ Rituals	Time	Place	Functionally connected with	Ritual specialist	Participants	Aim and motif	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
used earthen wares and the day of using new earthen wares for cooking		spot.					the used earthen wares which were used for cooking are thrown away, after bathing food is prepared, a portion of which is offered in the name of the ancestors.	Hindus.
9. Gobardhan- Puja : ritual of welcoming of the cattle	Kartik (October- November)	Living room cowshed	Cattle herding and Agricultural	Brahmin priest	"	Healthy growth of cattle and prosperity of the house	At first gooddes of prosperity is worshipped in the livingroom. generally Thereafter the Brahmin priest accompanied by family members, goes to the cowshed to perform welcoming ritual. The cattle are welcomed with a dish containing turmeric piece, paddy, rice, grains, vermilion, comb, mirror, clay and water of the Ganges, cowdung incense, lamp, clarified butter and grass. If herder is present he is also welcomed along with the cattle. The cattle are thoroughly washed with water, smeared with mustard oil, turmeric paste and vermilion before ritual performance. At the time of	It is limited among the upper castes.

[Contd. N. Page]

TABLE - III (Contd.)

No. Festivals/ Rituals	Time	Place	Functionally connected with	Ritual specialist	Participants	Aim and motif	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
10. Dheni-puja ritual of reaping	Agrahayan (November- December)	House and Paddy field	Agriculture	—	"	Good harvest	ritual the Brahmin priest recites sacred hymns. Before reaping a bundle of stalks with cereals is ritually brought in the house. This bundle is kept in a separate place with care.	
11. Makar- sankranti ;	Poush (December- January)	House	"	Brahmin priest	Family members	Harvesting festival	The ritual is observed by taking uncommon food items; cakes of rice flour and molasses, parched and fried paddy.	Fair is held in many places on this occasion. Low and upper castes observe this ritual with great exultation.
12. Chaatu- parab	Chaitra (May- April)	House and tank	Ancestor worship	Brahmin priest the upper castes	"	To appease the ancestors in order to get their blessings for good health, prosperity and welfare of the family.	Flour or fried paddy, gram etc. mixed together offered to the ancestors. The upper castes offer fruit, green vegetables and rice to the Brahmin priest. On this occasion house is cleansed with cow-dung solution and used earthen wares are replaced by new.	

TABLE - IV
CASTES AND RITUALS/FESTIVALS

Caste	Ritual Festivals	Time	Place	Ritual Specialist	Main forms
(1)	(2)	(3)	(4)	(5)	(6)
1. Baidya	Shiv-Puja : Worship of the God Shiv	Falgun : February-March	In the temple of Shiv; the temple is owned by the Vaidyas	Brahmin priest	Propitiation by reciting sacred hymns. Food offering (cooked and uncooked). Family members observe fasting until the completion of propitiation.
2. Vaishnab	Nandotsav : Ceremonial festival of the Lord Krishna (Childhood)	Bhadra : August-September	In the home of an influential Vaishnab of the village	Vaishnab-Brahmin or a Vaishnab	Propitiation by reciting sacred hymns. Devotional singing of the songs composed of the sacred names of the god Hari is the main form. Offering of food articles.
3. Modok	Ganesh-Puja : Worship of the trade and commerce god Ganesh.	Magh : January-February	In the house of a rich Modok family of a different village, Chairkurkanali, about 3 miles away from Ambikanagar.	Brahmin priest	Propitiation by reciting sacred hymns. Food offering, at least one from each family observes fasting.
4. Kumar	Chak-puja: Worship of the wheel which is the main device of making pottery	Baisakh : April-May	In each family separate worship is done.	Brahmin priest	"
	Eikhan-parab . Worship of the village tutelary goddess.	Magh : January-February	Outside the village in a traditional place situated opposite side of the river. the Kumars.	A senior member of a selected family among the Kumars.	"
5. Poddar or Sonarbene	Saraswatipuja : Worship of the goddess of learning.	Magh : January-February	On the main road of the village.	Brahmin priest	All the members observe fasting until the completing of the worship.

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TABLE - IV (Contd.)

Caste	Ritual Festivals	Time	Place	Ritual Specialist	Main forms
(1)	(2)	(3)	(4)	(5)	(6)
6. Keot	Manasa Puja : Worship of the snake goddess Manasa	Shravan : July-August	In the traditional sacred spot at the centre of the locality of the Keot (Keot para)	A senior member from a family who is appointed traditionally to worship the goddess.	Sacrifice of animals is important. Mediation (Jhupan) of the priest is important.
7. Dhoba	Eikhan parab : Worship of the village tutelary goddess	Magh : January-February	In the traditional sacred spot at the centre of village.	A senior member from a family who is appointed traditionally to worship the goddess.	Propitiation by chantings, food offering and sacrificing of the animals.
8. Dom	Sanyasi puja : Worship of the Shiva in the name of great heroes and monk. Kalubh-Kandrubar : Worship of the heroes Kalu and Kandrui.	Jaistha : May-June Jaistha : May-June	In the house and outside house at a traditional sacred spot.	Senior member of the family. A senior member of a Dom family who traditionally performs this task.	Food and narcotics.
9. Bagdi	Eikhanaparaba : Worship of the tutelary goddess.	Magh : January-February	In the traditional sacred spot at the centre of village.	A senior member from a Bagdi family who traditionally holds the right of worship.	Propitiation by chantings, cooked and uncooked food offering and sacrifice of animals.
10. Hari	Beyghrut-Birshapur puja: Worship of the deity of the Aigher and forest	Magh : January-February	In the traditional spot at the centre of village.	A senior member from a Hari family who holds the right of worship traditionally.	"
11. Bauri	Manasapuja : Worship of the sanke goddess Manasa	Jaistha : May-June; Ashar : June-July; Shravan : July-August Bhadra : August-September.	In three different places there are traditional spots where shrines of Manasa are located.	A senior member from a Bauri family who holds this right traditionally.	Mediation by the priest is important.

TABLE - V
RITUALS OR FESTIVALS ORGANIZED VILLAGE AND INTER-VILLAGE-WISE

No. Festivals/ Rituals	Time	Place	Functionally related with	Participants	Organized specialist	Ritual	Aim/ motif	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1. Hanam Sankranti: devotional song by traditional singers	Vaishakh-Jais- tha or in any other appro- priate occasi- on April- May	In the vill- age at the selected spot	General heal- th of the villagers	Most of the castes in the village	Village-wise	Vaishnabas and Vaishna- bite-Brahmin (Gosain) or Brahmin priest	To get super- natural help for protec- tion of the village from epidemic	The traditional devotional singers Most impre- the Vaishnabas, sing the song ssively per- composed of the sacred names of formed by the God Hari. Before devotional the Vaishn- singing a Vaishnabite Brahmin abs; low priest is appointed to worship castes also the God Hari and/or the Lord attend to get Chaitanya who was supposed supernatural to be the incarnation of the benefits. God Hari or Vishnu. The devotional singing is accom- panied with music of playing cymbals and tom-toms.	
2. Bipaditari- ni : Wor- ship of the godd- ess who have eno- ugh power to remove the dangers	Ashar May- June	In the temple of Ambika	"	"	"	Brahmin priest	To remove misfortune and danger from the village	All the families of the village In parctice contribute green vegetables and the goddess food articles and money to meet Ambika is the expense of the festival. The worshipped. Brahmin priest propitiate the goddess Ambika. Selected pps- sages from the sacred texts i.e. the Gita, Chandi and Mahavaral are recited by the Brahmins.	
3. Janthal :	Ashar	"	Agriculture	Most of the castes and communities	Microregion- ally	Brahmin pri- est Khatriyas (Babu), Kum-	For imme- diate rain	About a month before the schedule day of worship money, are not paddy or rice and other food directly	Low castes are not directly

[Contd. N. Page]

TABLE - V (Contd.)

No. Festivals/ Rituals	Time	Place	Functionally related with	Participants	Organized specialist	Ritual	Alm/ motif	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
				of the adjoining villages including this village		ars. Napti and a few other castes		articles are collected from the adjoining villages including this village. This collection is known as <i>magana</i> i.e. begging. The worship is performed elaborately and different castes of this and other villages have different roles : Brahmin priests invoke the goddess by chanting hymns, reciting sacred texts, Khatriya and sacrifice the animals offered to the goddess; Vaidyas, Khatriyas and Brahmins (now-a-days) are busy for mana- gement, Naptis collect the necessary articles which are essential for worship. Modoks supply confectioneries and other castes have also related acts. The propitiation of the goddess is made with offering green vegetables, fruits, sweets, uncoo- ked food and cooked food, and sacrificing of animals.	related with the real situation rather a social sepa- ration of different hierarchies is manifested in the action in real situati- on. But all the castes whether high or low should contribute same thing in this occasion.
4. Jitasthami	Aswin (Sept- ember-Octo- ber)	In the Cou- rtyard of the Zamidar	Health and fertility	Most of the castes of this village	Villagewise	Brahmin priest	Longivity and good health of the children	In the courtyard of the Zaminder communal worship of the God <i>Jmurbahan</i> is held. At least one woman (married) from each arately.	Low castes performance

[Contd. N. Page]

TABLE - V (Contd.)

No. Festivals/ Rituals	Time	Place	Functionally related with	Participants	Organized specialist	Ritual	Alm/ motif	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
5. Durgapuja: Worship of almighty goddess Durga	Aswin (Sept- ember-Octo- ber)	—	Prosperity, peace and power	Most of the castes of this village and other comm- unities outside the village.	Micro-Regional	Brahmin priest	For welfare, good crops, prosperity and strength and vigour	Main forms of worship are like that of other places of Bengal. The worship of <i>Durga</i> is related with the goddess <i>Ambika</i> and other deities are also propit- iated in this connection. The Tribal communities like Sartal, Sardar (Bhumij) and Mahatos of adjoining villages participate in the festivals. On this occasion a fair is held where people present their indigenous dance and they receive money from the Zamindar.	family observes fast upto next morning. Each woman comes here with a clay model of vul- ture and fox. The Brahmin priest chanting hymans, reciting sacred text and offering food propi- tiates the god <i>Jinubahan</i> . In this connection sacrifice of animals is also done. In the next morning mother and child of each family together take ablution with chanting. fox is gone to the forest and vulture is on the tree.

[Contd. N. Page]

TABLE - V (Contd.)

No. Festivals/ Rituals	Time	Place	Functionally related with	Participants	Organized specialist	Ritual	Aim/ motif	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
6. Pareshnat- her-mela a fair in the village Pareshnath	Pous : December- January	Outside the village	Agricultural	Various castes and communities from adjoining villages	"	Brahmin priest has limited function (only to worship)	To get super natural benefit which is essential in afterworld.	After propitiation of the God <i>Shiva</i> a fair is held. The partici- pants offer fruits and other food festival with great care. in the river near by.	Low castes observe this
7. Porkul-mela: a fair in the village Porkul	"	"	"	"	"	"	"	The God <i>Shiva</i> is propitiated at first, immersion of the puppet community of the villa- ge in the river is supposed to have much supernatural merits. Fair is held on this occasion	The Mahato community of the villa- ge enjoys dominant role in the festival.
8. Ganeshpurn: Magh Worship of January- the god of February trade and commerce	Magh January- February	In the house of a rich Modok residing outside the village	Prosperity of the castes and trade	All the Modok families of adjoining villages	"	Brahmin priest	To get blessings of the god <i>Ganesha</i> for prosperity	All the Modok families of the adjoining region contribute money, green vegetables, fried paddy, rice, paddy and sweets to the partici- pant meet the expense The Brahmin priest propitiates the God on behalf of the Modok caste.	Only Modok castes are the partici- pant.
9. Shivgajan : Chaitra Worship of the God Shiv and fair	Chaitra March-April	In the neigh- bouring village	Crises of life i.e. birth marriage and long life; health and progeny	Almost all the castes and commu- nities of the adjoining villages	"	Brahmin priest has limited function	To fulfil the vow which is taken in order to get the favour of the God for progeny, cure from disease etc	The God <i>Shiv</i> is worshipped by the Brahmin priest. The partici- pant after taking bath pour down water, milk and fruits, flowers and parched paddy, paddy, rice in the name of the god. Many participants observe physical constrain as a vow. Sacrifice is also done on this occasion. There is a fair of the festival.	Low castes exuber- ntly observe this festival.

TABLE - VI
RITUALS OR FESTIVALS ORGANIZED INTER-CASTE-WISE

No. Festivals/ Rituals	Time	Place	Chief-Participants	Inter-castes relation.	Ritual specialist	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. Navabarsha (New Year's day)	1st Vaishakh (15th April)	In the shop	Modok families and other castes who are owner of the shops in the village	Shop owners and rest of the villag- ers, particularly, those who purch- ase commodity goods from the shop.	Brahmin priest	Purification of the shop and propitiation of the god of trade and commerce <i>Ganesh</i> , is done by reciting sacred hymns and offering food. New account book is also worship- ped alongwith the god <i>Ganesh</i> . The clients are invited and served with food etc.	Low castes rarely Participate
2. Harisankir- tan : devo- tional sing- ing of sac- red names	Vaishakh- Jaistha (April-June)	In the pub- lic place (Hammela)	Vaishnabas	Vaishnaba and rest of the villagers irrespec- tive of castes	Vaishnab	Cf. Table No. V. Serial No. 1	Brahmin or Vaishnab priest is engaged for insta- llation of sacred pot where offering is made in the name of Hari and Vishnu

[Contd. N. Page]

TABLE - VI (Contd.)

No. Festivals/ Rituals	Time	Place	Chief-Participants	Inter-castes relation.	Ritual specialist	Brief Description	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
3. Manasapaju: Worship of the goddess Manasa	Jaistha-Sravan (June-July- August)	In the pub- lice place and in the house of a Bauri family	Bauri	Bauri and caste Hindus	Bauri	Propitiation is done by a Bauri member who is supposed to be favoured by the Goddess <i>Manasa</i> ; caste Hindus participate the following way; they offer mon- ey, food articles and animals (rarely) and take <i>prasad</i> . Propi- tiation ceremony continues for three days. Sacrifice of animals and mediation are important.	
4. Jitasthami : Worship of the God Jimutabahan	Aswin (Sept- ember-Octo- ber)	In the courtyard of the Zamindar	Khatriya	Khatriya-Brahmin and rest of the community	Brahmin priest	cf. Table No. V. Serial No. 4	Low castes rarely participate
5. Go-jagano : To awake the cattle	Kartik (Octo- ber-November)	In each Household of caste Hindus	Bauries and Deswalis	Bauri, Deswali and caste Hindus	Bauris and Deswalis in group	By singing and drumming the Bauris and Deswalis visit the houses of the caste Hindu to awake the cattle. In the next morning they receive money, paddy or rice and sometimes used clothes from the families which they visited.	

image with marks of thick vermilion strain and installed in a temple of pucca building near the *Rajbari*. The goddess is believed to be very powerful and active and has well reputation in the area. Besides the shrine of mother Ambica, there are three separate spots—*mandopa*, for annual worship of the goddess Durga. There are sheds and temples in Rajbari for different deities of both the *Sakta* and *Vaishnav* cult. The temple of Shiva is situated in the Vaidya locality and the open walled shed in the Vaishnav locality is used for devotional songs by the Vaishnavas. A few Brahmin families have religious spots within their courtyard. The intermediate castes have no traditional spots within the boundary of the village where they can observe communal ritual¹ but the low castes have their respective ritual spots which are situated in their respective locality usually under a tree or bush.

The rituals and festivals are integrated with social-economic life of the villagers. The observance of rituals and festivals round the year reflects the structural pattern. On the basis of participation the rituals and festivals can be categorized under seven heads : sex-age, family, lineage, *jati*, inter-*jati*, village and inter-village. These rituals are described in the following tables (Table II-VI). in the analysis of ritual organization it is evident that different structural units viz. sex-age groups, family, lineage, *jati* and village become prominent and work at least in the ritual level. In the same level inter-*jati* and inter-village organization can also be noticed (Table-VI). Inter-*jati* organization is found in *gram sholoanna* or village communal festivals and in other rituals : inter-village organization is found to be associated in two different levels: in the *jati-sholoanna* or communal ritual of respective caste e.g. the Modak of different villages perform *jati-sholoanna* or communal ritual in one place where inter-village organization by the Modaks can be traced. This ritual stands mainly for *jati* solidarity. Secondly, on certain occasions (Table-V) a few villages participate in certain common ritual situation. These cases are the manifestation of inter-village solidarity. Inter-village participation is also noticed by Mandelbaum (1968) Oppler (1956). Srinivas and Shah (1960) who observe inter-village interaction specially on economic level. But Mandelbaum observes it in religious level “....there long have been the religious interaction of going other places. A ceremony staged by the people of a village often draws visitors from miles around. In every region of India there are holy places which people visit on special days or at any time when impelled by a pressing need.” (1968 : 41).

Jati-sholoanna or communal ritual organized castewise is not found

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1. The Kumars observe : communal ritual in a spot outside the village on the west bank of the Kungsabati : recently the Sonarbenes communally organize Saraswati-puja, worship of the goddess of learning in their own locality. The Modaks observe their communal festival in the village Chirkurkanadi five kilometers from the village.

among the upper castes except the Vaidyas : it is found among the middle castes in general except the Malakar, Chhutor and the Napit, and the low castes except the Bagdi (Table-IV). The *jatis* who belong to the middle and low castes but those who do not observe *jati-sholoanna* are represented by a small population (Table-I). A few of this *jatis*, namely, the Bagdis observe this *jati*-communal ritual with the Bagdis of the village Hatikheda which is situated about one kilometer south-west of this village.

The rituals observed family-wise are mainly associated with agriculture and mostly found among the caste Hindus (Table-III). The low castes observe this type of rituals twice in a year in connection with ancestor worship-once in the month of Kartik and other on the last day of Bengali calendar year and are known as *hari kara* and *chatuparab* respectively. Patrilineal lineage organization through ritual can be noticed on certain occasions among the Brahmins and Vaidyas only. One Brahmin lineage performs *Kali-puja* and the Vaidyas perform Shivpuja and Durga-puja when all the lineage members participate. The *jatis* belonging to low castes do not observe the ritual which are organized sex-age-wise, Thus in the analysis it becomes evident that ritual study in a village gives important clue on the structural pattern of the society.

Rituals with reference to Sex-Age Segments of village population

The structural analysis of the village is usually done with reference to family and caste (*Jati*). But here we focus the main interest on sex-age segments which are considered as the structural units of village system in certain real situations (ritual organization). These units of any population are important in the study of personality formation, socialization and enculturation processes. In the course of analysis of rituals it is also revealed that ritual processes are often symbolic statements about a normative social order. The main aim of the present study is to demonstrate that the sex-age segments are the structural units functioning through ritual organization.

I

Ritual is a symbolic system through which social individuals interact and express the social order incorporated in the intricate structure of rituals. Analysis of rituals (system of symbols) in the structural context will provide some information about the functional requirements of the society. Then casual and functional explanations are made to have a meaningful analysis of the ritual pattern. It is not only interactional or expressive means but as a cultural form ritual is instrumental or a set of techniques in order to achieve the objects laid in the ideology of it. The objects are functional requirements by which social system can operate and continue successfully. In social and cultural contexts limited functional requirements found in the study of rituals are identification, communication, reinforcing normative role and social order and integration. The analysis of ritual in the following pages will illustrate the above functional requirements in the village-segments of a larger society.

II

All together there are seventeen *jatis* (Table-I) who are broadly following the apparent characteristic of the caste system. The general rule of descent is patrilineal, patrilocal and patriarchal, the general feature of family is extended joint family consisting of three vertical generations with possible variations of simple and extended family of two or three generations. The main economy of the village is agriculture. Most of the land is distributed among a few families of the Brahmin, Khatriya, Kayastha, Vaidya, Modok, and Poddar. The untouchable castes are landless agricultural labourer and supply the bulk of labour force in agricultural season.

In religious level independent organizations of family, lineage, caste, village and micro-region can be traced. In that situation these units become distinct in terms of independent goal achievement for respective unit. Among the Brahmins and non-Brahmins each family observes separately the family rituals. There are various rituals named as *Jiurpuja*, *Rohini*, *Khaidheyra*, *Lakhmipuja* which are mainly connected with agriculture and performed family-wise. Among the outlyings family wise ritual organization is found mainly connection with ancestor worship in the month of *Kartik* (Oct.-Nov.) on the day of *Kali-puja* and the last day of Bengali calander year. These are known as *Harikara* and *Chatuparb*. Patrilineal lineage organization in ritual can be noticed on certain occasions among the Brahmins and Vaidyas only. One Brahmin lineage performs *Kali-puja* where lineage members participate. Among the Vaidyas the lineage members are organized on the occasion of *Shiv-puja* in the month of *Falgun* (Feb.-March) and *Durga-puja* in the month of *Aswin* (Sept.-October).

Different castes have different religious festival when members of respective caste participate and become distinct from the rest of the society. This religious festival is known as *sholoana-puja* i.e. communal festivals exclusively for the caste. Following castes have tradition of communal festivals restricted within the castes : Vaidya : *Shiv-puja*, Modok : *Ganesh-puja*; Podder : *Saraswati-puja*; Kumar : *Kali-puja* and *Eikhan parab*; Keot : *Manasa-puja*; Dom : *Kalu-bir-kandu birerpuja*. Hari : *Bayghrut-Birjhapur puja*; Bauri : *Manasa and Geram puje*. Caste festivals are not found among the Brahmins, Khatriya and the Kayasthas. Village festivals, where every family of the village participate, are *Jathal*, *Bipadarini puja* and *Harinam sankirtan*. The motives behind the festivals are rain, good harvest and welfare of the village. Particularly in *Jathal* neighbouring villagers also participate. Besides, in few other festive occasions people from different villages participate in few religious festivals. In this region two festivals i.e. *Pareshnather mela* and *Parkul mela* are significant where people from fifteen to twenty villages participate. The participants are motivated with the idea that by virtue of participation they will earn supernatural blessings for themselves, and also for their family members. Another festival, *Shivgazan*, is important where superantural as well as recreational motives of the participants can be traced.

III

In the above analysis, ritual organization that can be traced in different levels, are the segments of structural morphology of the society. There is another grouping based on sex-age which is termed statistical group. Mannhelm suggests "when the statistical classification corresponds to a social or psychological bond, the data obtained may have considerable value in helping us to understand social process.....". In the foregoing page we have suggested that main aim of this paper is to understand sex-age segments which are functioning through ritual organizations. On the basis of ritual organization we get following categories of sex-age segments :

Table-2

Sex-age segments	Ritual of organization	(Motive apprent)
A1 Male boys (age : 6-12)	<i>Ijal-pinjal</i>	Recreation
A2 Male youngsters (age : 14-20)	<i>Chonk-chhenda</i>	Recreation
B1 Unmarried girls (age : 6-12)	<i>Itu-puja</i>	Recreation
B2 Married Women (age : 16-40)	<i>Mongoler puja</i>	Welfare for the family

A1 : Ijal Pinjal

Just after sun down on the day of *Kali puja* in the month of Kartik (November) one can notice an unusual scene in the village. In the darkness, a number of glowing fire balls are moving with a peculiar shouting by the children of the village. From a close distance it can be noticed that a group of boys rotate a glowing fireball which is attached at the tip of an wire string and the free end of the wire is held in the grip. The fire ball is made of tattered clothes and soaked in kerosine it becomes highly inflammable. It is done in an open space not far away from the house. The senior members often help the boys to light the ball. In each group one boy becomes the chief performer who holds the string of the fire ball and others remain spectators and watch the situation and enjoy the scene and often utters *Ijal-pinjal* following the chief actor. On the same night several festivals are also observed by the villagers. The festivals are : worship of the goddesses of prosperity and misfortune (locally termed as) (*Lahhmi-Olakhmi puja*), ceremonial lighting of the house (*Dewali*), worship of the goddess of power (*Kali-puja*).

The participants, self governing playmates, in different small groups participate in common action of rotating fire ball and shout with the peculiar utterance *Ijal-pinjal*. The action is culturally prescribed and traditional. The goal from the view of the participants, is fun or recreation through prescribed

way. The situation is an interactional situation : interaction among the boys and the senior members who occasionally light the fireball and guard them and keep watch for any mishap from fire; boys and rest of the society who passively observe the scene are compelled to conceive autonomous role of the novices who are the emerging force of the future. It is evident from the ritual that the role of different participants is assistance assisted (between boys and senior members), active participants, passive observers (sex-age groups and rest of the society), common participants (among the boys). The first role signifies handing over of the experiences of senior members to junior members. It is a normative order of the society where 'giver' and 'receiver' status are involved. Function is continuity of known techniques from generation to generation. The third role signifies identification of the participants in a common group. The second and third sets of role further signify a social process of contact and distance within the group and outside the group in terms of ritual participants and non-participants and as a result goodwill, trust and co-operation are established. By identity in a common group, collectivity is developed which in turn reinforces group integration which is unrecognized real function of the ritual and apparent and recognized function is recreation. The symbolic meaning of ritual as a whole is a learning process for the participants about social integrity, group identification and other day to day activities. Socialization, enculturation and consequently personality of the individuals develop through a series of rituals of which it is one.

A2. Chonk-Chhenda

At the night on the 8th day of new moon in the month of *Bhadra* (August-September) the youngsters; in group, go out at night to steal something edible from neighbours' houses as well as from their gardens. On this occasion specially fruits and green vegetables are the main alluring objects which they consume collectively.

Apparent motive of the ritual is stealing which is highly offensive and a crime. It goes against the conventional social order and it becomes a paradox when we say symbolic meaning of ritual stands for preservation of normal social order. But in ritual situation in many societies the acts which are normally forbidden are done. As for example the Australian aborigines kill the totem and ceremonially eat the flesh of the animal (totem). Freud explains this behaviour as 'primal behaviour' in order to find out the origin and function of this behaviour. To solve this apparent paradox we should proceed in different way for the sociological meaning of this ritual. The participants are social members who are experiencing new physiological change. With the changing physiological condition social and physiological behaviour of the people undergo a change and consequently status and role are changed. At this situation initiation ceremony is observed in many primitive societies which is the mark of social recognition of the adulthood subsequently new status and

role. The adulthood not only implies sex maturity but also a status of social responsibility as well as capability of doing work independently and to fulfil the economic and social requirements necessary to support a family. These characteristics are manifested in day to day work through various social and cultural activities. In this particular ritual the participants are those who are now attaining or have already attained sex-maturity; the motive of ritual is to break an order (which is forbidden in common situation), have a direct relation with forbidden act (stealing) but the acts are sanctioned by society and cultural means to achieve the goal (observation of the ritual). The mood of the participants is a satisfied condition of the urges and is achieved by an exciting experience. So, latent unrecognized function of the ritual is recognition of adulthood of the participants.

Females of the village are organized in two different rituals viz *Itu-puja* and *mongoler-puja* according to age and social condition. The unmarried village girls and the married women observe *itu-puja* and *mongolerpuja* respectively where collective and individual endeavour can be traced and family residence becomes the centre of performance.

B1 Itu Puja

In *itu-puja* an earthen bowl is collected beforehand and loose soil is prepared in order to fill up the bowl. Water is added in the soil of the earthen bowl and it is prepared as a miniature model of nursing bed. The girls in separate groups go out to collect several varieties of grass. The seedling of different grasses are transplanted in the earthen bowl. The earthen bowls are supplied by the village potters. Seedlings are collected by the village maidens of the age group 6 to 12. In each household mother generally supervises the occasion. Every day in the morning the maidens sprinkle water on the seedlings and loose earth and with great care and patience watch the seedlings for one month. The ritual seems to be practised as a fertility cult. But it has more implications besides fertility cult. To understand these implications Durheim's postulation on the reality of religion and the existence of religious phenomena as the idealized and transformed form of social phenomena are convincing as well as helpful. The phenomenal acts are the idealization of the social order. Religious behaviour does not exclusively depend on religious context. Simmel also postulates the same, "Even in its autonomy, religious life contains elements that are not specifically religious but social" (Simmel) and similarly, O'Dea concludes, 'religious response involves relationship, and that relationship in the religious experience is modeled after ordinary relationships in the society.

The acts of the girls in *itu-ritual* suggest generalized role of a female member (mother and wife) —preparations and collection of requirements for the functioning of family, nursing, watching and rearing of the children. The role of mother i.e. to rear and care the child and to help it in every possible way to grow on is also imbedded in the acts of the girls in the ritual. Besides

the roles of mother, the females have to perform the role of wife and she becomes an indispensable member in the family. Preparation means constant work for and to make ready all the requirements of the domestic life. All these actions are idealized in the ritual and the girls attend a course of learning of social duties and performances through ritual. So ritual also serves as a means by which the people can learn and acquaint with the objects and duties of social life.

Besides, the acts and contents of the ritual also suggest some behaviour found in the predominant economic pattern of this area. The aim of the ritual is to observe the growing seedlings. In agricultural operation we can trace preparation of the field; it requires collective work for transplantation, individual endeavour of constant watching and nursing the field, finally harvesting after a prescribed time period. Water, fertile soil, both collective and individual labours are essential in agricultural agrarian economy and in actual operation in this area. Thus internalization and idealization of day to day work reflect in the ritual actions and become the goal of the ritual.

B2 Mangalar Puja

It is performed weekly on Tuesday in the Bengali month of *Jaistha* (May-June). Married woman of each family observes this ritual for the welfare of the family. The Brahmin priest is essential to conduct this ritual. A family is selected where women of a few other families belonging to upper castes are assembled and observe the worship of the supernatural power responsible for peace, welfare and comforts. The priest is appointed who communicates with the supernatural power on behalf of the female folk. In welfare ritual we get sets of relations: within the common participants (i.e. married women) married women and priest, and married women within the family of their own. The role of women in group participation is undifferentiated where they identify themselves with a common object which is collectively satisfied by performing the same ritual. The objects and the performance require enquiries on two different levels. The object is to achieve welfare of the family. The performance is ritualized act which can secure the merits only under the condition that the priest should be appointed in order to appease the supernatural force on behalf of the female folk. It means that the female folk of the household organize all the requirements under the authority of some male members to achieve their goal which is the rule of patriarchal society. So the role of men and women in a unit can be explained in relational terms as mentioned above. In a family role of women is that of mother and wife. The motive of ritual is related with family which is to achieve welfare (for the family). It is the role of a woman in the family to maintain peace and harmony and other related works which should be performed by the women as mother and wife. Ritualization of these functions can be easily evident from the analysis mentioned above.

In another level of explanation the welfare ritual can be supposed as the process by which the normal social order is maintained. They share the common notion that family is the ideal place for women and they have to do all sorts of duties concerning the welfare of the family. But disposition of duties and rights of women require a recognition and support of the male (i.e. husband etc.) which are important. So, women (married) cannot communicate with supernatural force (which is outside the family) unless in presence of a sacred male person.

Few rituals are organized on the basis of sex-age segments (statistical group). Ritual analysis is made in structural context to get relevant information about social life of the villagers. Beginning with a brief description of village structure an attempt is made to show how rituals are organized in relation to the structural morphology (family, caste, village and micro-region) of the society. In the next step ritual organization on the basis of sex-age segments is attempted. Much attention is given to find out the symbolic meaning of the ritual in social terms rather than religious.

In the first ritual, role analysis reveals the relation of the boys with senior members which is also the normative order of the society; it is also important for transmission of experiences from generation to generation, relational continuity and learning process of social facts, by social process of contact and distance. Within and outside the group, identity, collectivity and cooperation are developed where social integrity can be traced.

The apparent meaning of the second ritual becomes paradox as it is going against the norm of the society. But in different way of explanation the symbolic meaning of ritual is found in deeper level, which reveals the recognition of the beginning of the adulthood.

The third ritual explains the role of female folk in family. It also reveals the facts of internalization and idealization of some day-to-day activities which are distinct in the ritual performances. It refreshes the participants about their normative roles in the society.

The forth ritual also signifies the normative role of women within family and relation of male and female as prescribed by the society.

Thus, the field data reveal that sex age segments are structural units functioning in the real situation during observation of particular rituals; these rituals symbolized few important requirements of the society : integration, identification and communication.

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Ethnoscience, Folk Classification of Environmental Resources and Sustainable Development : Some Descriptions

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The problematiques of sustainable development :

The framework of the present research is based on ecology, concerned with the relationships between living things and their environment. The research question in the present study has been set up to understand whether the members of different ethnic groups with different cultures living in the same environment perceive their environment in an identical manner or not and how they utilize their perceptions. Knowledge of different ethnic groups about their environment has been given priority importance, as this can be perfectly utilized in enhancing environmental preservation and development. For these purposes three distinct domains of the environment such as land, plant and animal have been intended to be considered. This reduction of environment is necessary because these domains play important role in the livelihood of the people under study. The knowledge of the tribal people like the Juango, the Sahara, the Munda, the Ho, about these domains and their utilization required systematic probing to understand the differential ways and degrees of utilization of natural resources for their sustainable, development.

Empiricism is confined to the land domain for the present discourse. The land use pattern of these tribes reflects hundred years of human trial and error against the ecological limitations governing the environment. These people are still using their indigenous techniques of cultivation and are rigid in terms of their knowledge regarding crop varieties and their yield. In this research emphasis is given on utilizing peoples' view on their agricultural process and their view on the question, of improving the same. According to their prescription crops are to be chosen to avoid wastage or effort regarding sustainable development. Along with peoples' prescriptions, possibilities and ways of introducing new crop varieties were investigated and accordingly peoples' idea of renovation for getting maximum benefit was accounted for. Aspect of conservation of renewable resources, more effectively was also considered simultaneously.

Regarding plant and animal resources the perception was not recorded in order to investigate ways of utilization of land resource. In this context principles of folk taxonomy were used to get a clear picture of peoples' perception. The relationship between folk taxonomy of environmental domains and utilization of natural resources by the members of different tribes becomes problematic. Folk taxonomy refers a system of monolexemically labeled folk

segregates related by hierarchic inclusion. Thus it was believed to represent the cognitive aspect of a culture as a part of language itself. Whereas, the utilization of natural resources, referred to the peoples' behaviour for survival. It required focus in the study for two main reasons:

- (1) To record how people utilized their knowledge of environment in their practical life and
- (2) To show that although folk taxonomies carried especially close relationship with the language, it was regarded as a part of non-linguistic culture. The language users encoded objective experience and sorted out and distinguished experiences differently according to respective languages, which have certain effects on behaviour.

The perspective of gradual loss of ecological balance stressed the importance of various social and cultural practices of the people in question. The people conceived the ecology as relationships between them and their environments. The indigenous concept had been considered to see relationship between the people and their environment. In various developmental programmes of the people, such peoples' viewpoint could seriously be considered as helpful to design suitable plans to advance ecological balance. On the basis of these reasons the present consideration of the study was regarded as the first step towards such understanding.

The present study belonged to the domain of ethnoecology. Ethnoecology has got its root in ethnoscience. The author looked into people's environment as perceptual, effective and the total reality. The present study emphasized the description of perceptual environment and its utilization for the practical life of the tribes. This approach helped to understand the fact of peoples' knowledge about their environment and how they categorized this knowledge to use their environment (Sengupta, 2003).

The unit of study was not the village, but the tribes in diverse environment near Ghatsila hill and forest, Mallagiri hill and forest of Pallahara. The tribes conceived here as a homogenous population in terms of culture, which determined the material phenomena significant to its members and the way its members organized them.

The unit of study for the present work was considered on the basis of information collected during pilot study carried out in Dhenkanal District of Orissa among the *Juango* and the *Sahara* tribes residing near *Mallagiri* hill and forest; the Santar, Munda and the Ho residing near Ghatsila hill and forest in East Singbhum District of Jharkhand state. The data from the pilot survey showed that the members of these tribes utilized the natural resources differently, organized differently and exposed their dependence on natural resources in different degrees. Briefly it indicated that the *Juango* intensively depended on forest products for their livelihood; the Munda, the Ho and the Santar depended more on agricultural products, the *Sahara* occupied a position in between these two.

The present research therefore portrayed ways of using natural resources, the ways the tribes suggested its protection and growth in a way of classic ethnographic model. It explained the whole economic sphere, which contained within each house constituting own autonomous centre of production. Each household suggested itself the different ways of using and representing the environment for sustainable development.

The folk and the environment :

The present research has received slight modification for change of places of field work among the communities like Munda, the Ho and the Santar. All these three communities speak Austric language. During the period of April 1999 to February 2000 the researcher did field work in three different time periods in and around Ghatsila particularly in *Chakulia* village. This village is inhabitation of the Santar, the Munda and the Ho. All the three communities are basically agriculturists and mainly depend on cultivation of paddy with the advent of monsoon rain.

As it is pointed out in the proposal that among the three distinct domains of environment, land domain is given priority importance. Therefore the knowledge of the tribal people like the Santar, the Munda and the Ho about this domain and its utilization was systematically probed through subsequent three field work periods with a field assistant.

Among the different ways and degrees of utilization of natural resources for sustainable development of land was considered *sine-qua-non*. Therefore the data were collected on the perception land and its categories. The land patterns of these tribes reflected hundred years of human trial and error against the ecological limitations governing the environment. A few of these people as it is noted from the data were exposed to industrial environment like HCL factory located near about, even then the cultivators were still eking out their living simply by using their indigenous technical lore of cultivation and were rigid in terms of their knowledge regarding crop varieties and their yield. During the data collection on the perception of land and its utilization emphasis was given on peoples' view on their agricultural process and their view on the question of improving the same for sustainable development. The data indicated that they believe the prescription of crops was to be chosen to avoid wastage of effort regarding sustainable development. Along with peoples' prescription the researcher received possibilities of indication and ways of introducing new crop varieties through which peoples' idea could be renovated for getting maximum benefit.

In *Chakulia* village as the Santar, the Munda and the Ho speak Austric language the same lexemes were used for perceiving the land categories. The data indicated that there were several features for identifying land types with definite discrete lexeme. The Santar, the Munda and the Ho either used *Ot* or *Ote* to designate and denote land. The locational feature of the

land was considered important. The typologies of land situated in different levels were denoted by several names and utility of particular land as supportive feature was occasionally used to disseminate the use pattern of land categories using separate lexeme. Firstly the informants expressed that the *Ot* (land) or *Ote* was put into different inclined levels and identified with two terms *Latar ote* and *Chetan ote* to indicate the lands located in upper and lower level respectively. The land in the upper level in terms of its utility was further categorized into land for *orah* or *Oah* (homestead land), the *Bakhul* (homestead compound), *Budgay* (land for kitchen garden), *Puriadanga* (grazing land) and *Jaher* or *Singbonga than* (land of sacred grove); the land in lower level was denoted as *Baid* (land for cultivation).

Among these land categories most important for livelihood was *Baid*. The informants agreed that they depend on rain water as no irrigation system prevailed. Therefore their opportunities for crop rotation was ecologically circumscribed. As the land was located in inclination the informants used separate lexeme to categorize them. In this categorization three features were important :

- (1) The texture of the soil in identifying the mixture of the *gitil* (sand) and *hasa* (mud) with their proportion :
- (2) The water retaining capacity of the land.
- (3) The seed variety and the productivity.

They were not very cautious about the market value of the paddy variety as they reported that they had very limited occasions to sell their production in the market. Therefore they forcefully denied the role of market in the choice of paddy variety. They categorized the land into high and low land. The high land was of two categories : *Dhipa* and *Gada*. The low land was also categorized into two types : *Sakra* and *Baihar*. These categories they made on the features of the location of lands. The *Dipha* land was used for kitchen garden products and the *Goda* land was used for cultivating *Goda baba* or *Goda huru* (paddy). *Goda baba* was the paddy variety of short term from sowing to harvesting as they reported and as the researcher observed that this variety took only three months. This paddy variety was coarse variety and they consumed it during fallow period of cultivation. The texture of the soil of the lands when expressed using separate lexemes, the informants indicated in *Goda* land, the proportion of *Dhuri* and *hasa* (mud) was almost same. The water retention capacity was very low and therefore they used broadcasting method of cultivation as the land was located in upper level, water trickled down to the *Sakra* and finally to the *Baihar* lands. The informants were very much inclined to the *Sakra* and *Baihar* lands. *Sakra* land consisted of *Gitil* (sand) and *Matiar* (mud) where the proportion of mud was slightly more than the *Gitil*. It was reported that the *Baihar* land consisted mainly of mud. In these two types of land they cultivated *Rawal* (fine) paddy varieties popularly known as *Majhi huru*, *Chandrakanti huru* and *Samuddar*

huru. All these were traditional seed varieties with the productivity rate of 17 *Khachi* per *bigha* (0.42 decimal) of land. The *Khachi* is a local measure of 40 Kg. of rice. The size of the *bigha* was slightly greater than other parts of the country and therefore the productivity rate with traditional technological lore was slightly low. For the sake of sustainable development the seed varieties may be replaced by improved varieties keeping the phases of cultivation as such with which the tribes in question were acquainted with.

Ethnoscience and cognition :

Ethno science is defined here as the study of the system of knowledge of nature and the physical world held by a particular cultural group, especially a group not employing formal scientific data and analysis. Ethno science mainly deals with the study of different perception and the ways, the people order and organize these perceptions through their languages (Stuart 1964). In this discourse three tribal groups who live in the country side and exhibit the cognition of their natural world applying their own wisdom and knowledge have been considered. These three tribes herein are called as "folk". They are the **Juango** of Samala in Denkanal district of Orissa state, the **Santar** of Amainagar and the **Ho of Chakulia** located in east Sighbhum district of Jharkhand state.

The folk under study seeks adaptation as universally required both in favourable and unfavourable natural conditions. The folk find the way utilizing natural resources both conservable and utilitarian. The folk cognition of resources varies from folk to folk. Thus it is noted that the culture of a folk prescribes its members to distinguish this edible and non edible species as well as destructible and conservable species. It is de *rigueur* for their survival. This also dictates the folk to categorize his nature. In categorizing the nature the folk use their own logic and wisdom. There are different grades of categories which were done on the basis of specific features of each category usually like the scientific classification of the biological world. The folk classification of natural resources has been considered here for unveiling the qualitative aspect of the concept of resources and the environment. The capability of the members of the folk to classify their world indicates their consciousness about the resources which they utilize preferably. It is noted that the perception about a category sometimes vary from one individual to another. Even then a universal feature is found. This domain of knowledge is thought of as a cultural consensus domain and it is distributed across cultures. It is framed up with shared information within the same culture (Sperber 1990, Tooby and Cosmides 1992). Therefore the folk classification is taken here as a tool to grasp the folk own viewpoint regarding their ways of living.

Ethno science and ethno ecology are two sides of a single coin. Conklin and others view ethno ecology as an approach to human ecology. It derives

its goals and methods from ethno science (Conklin 1967, Frake 1962, Johnson 1974:87). Ethno science thus defined is the scientific orientation of an ethnic group's own viewpoint about different facts of life. The present discourse concentrates on folk system of classifying the natural and social phenomena of their world (Sturtevant 1964:105) The author started to accumulate knowledge on folk cognition specifically on utilized 'natural resources. It is already stated earlier that the cognition of the **Santar**, the **Ho**, and the **Juango** communities were dealt with from the **Key** informants of the villages Amainagar, *Chakulia* of east Singhbhum district in the state of Jharkhand and Samala of Pallahara in the state of Orissa.

The author culled data on some aspects of cognitive foundation like perception about agricultural land. The fundamental cognitive theory suggests that the individual becomes important as a unit of analysis where cognition is shared by all (Wallace 1968 : 536) It is noted that the cognition of the folk in question about any aspect has a direct link with utility, thus it became important to the author to unveil the relationship between folk cognition and utilitarian aspects. Atran (1993:20) pointed out the folk names and classified those organisms in the environment that had some immediate functional significance to them for survival.

The tribal folk and their wisdom :

To note and classify the particular domains and environmental resources, tribal wisdom needs serious consideration. It seems in the plan that several developmental project has been launched for upliftment of different backward and tribal communities but even now there generates the feeling that their opinions have never been considered launching while developmental programmes. Cognitive anthropology and its methods sincerely toned down this scope of the folk people to be aggrieved for the evaluation of their participatory development. The author considered the wisdom of the tribal folk like the **Juango**, the **Santar** and the **Ho** and analyzed the information of the said folk with the logic of ethnoscience. The community members namely the **Santar** and the **Ho** are agriculturists and the **Juango** are the shifting hill cultivators and basket makers. These agriculturists folk possessed land as most important natural resources followed by plant and animal in order of preference. The shifting hill cultivator as well as basket maker Juango puts interest on raw materials like green bamboo available in forest and the hill slopes to use for shifting hill cultivation.

The study of the perceptual and effective environment of the **Santar** indicated that the earth consisted of five classes of thing such as *Daare* (plant), *Dhiri* (stone), *Dah* (water), *Janjanwar* (creature) and *Nehorko* (people). These things are broadly differentiated into two categories: "having life" and "no life". It was noted that the *Nehorko* was categorized into two types: *Hor* (the Santar) and *diku* (non tribal). Each of these sub categories is classified hierarchically, for instance *dhiri* (non transformed stone) was further classified as *Buru* (hills),

Dhiridungri (fallow land), *Baid* (cultivable land) and *Hasa* (soil). The *Buru* was identified in different names according to the growth of vegetation such as *Gulpidi* (hillocks) where no vegetation was found and *Rohod Buru* where water source was scanty. The major resource for their livelihoods is land.

Morphological and behavioural data helped in first categorization of land. The land was denoted in several terms : *Dhiridungri* and *Baid* as referred were two categories of fallow land and agricultural land respectively. The land was also classified in terms of contrasting feature : *Chetan* (high) and *Namol Latar* (low) levels and also in terms of fertility. There are terminologically distinguishable four types of land and three types of ecological field zones. The **Santar** expressed the quality of land in terms of fertility of the soil condition. The fertility was measured by amount of crop yield per bigha and water retention capacity of soil. In viewing land the **Santar** used two dimensions: level (high versus low) and fertility (fertile versus non fertile). The *Hasa* (soil) of the land is distinguished on the basis of colour. Each soil type had specific use according to the cultural values of the folk.

The term *Hasa* is used to denote land as well as soil comprehensively. The portion of *hasa* which they cultivate is *Baid* and where they live is *Basut*. The *Goda* land is differentiated into *Basut* (homestead land) and *Burgay* (kitchen garden). The *Basut* and *Baid* lands are distinguished into different *Sar* (level) : *Chetan* (high) and *Namo* (low) respectively. The *Burgay* is cognized as small parcel of land attached to their *Bakhul* (homestead compound) surrounded by *Jhati* (fence) and without any *Hir* (dyke). On the contrary the *Baid* is located far away from the homestead compound, large plots surrounded by dyke where they cultivate *huru* (paddy). These lands are located in different levels and with different *bolgaria* (fertility). Four land types are under their cultural cognition in order of heights : *Gora*, *Ghutu*, *Dhipa* and *Bohal/Baihar*. Besides they culturally cognized three types of non fertile ecological land zones : *Gulpidi* (hillock), *Puria danga* (grazing land) and *Gandrapada* (riverbank).

The fertility of the land is dependent on nature of *hasa*, retention of water and crop yield per *bigha*. Thus through eliciting procedure a paradigm of land types was made to denote their views about lands with dimensions: with level and fertility. This paradigm is shown in figure 1. The figure 3 explains that the fertile high land includes *Goda* and *Ghutu* and the fertile low lands are the *Bohal/Baihar* and *Dhipa*. Similarly the high infertile lands are *Puria danga* and *Gulpidi* areas while the infertile lands are confined to *Gandrapada*. The cognition of the different types of cultivable lands and their identification depends on the attributes for categorization like the quantity of *Murum* (kankar), *Gitil* (sand), *Losot* (stiky soil) and *Rong* (colour). The presence of these attributes in varying proportions described by the people in terms of *Daria* (more) and *Etang* (less).

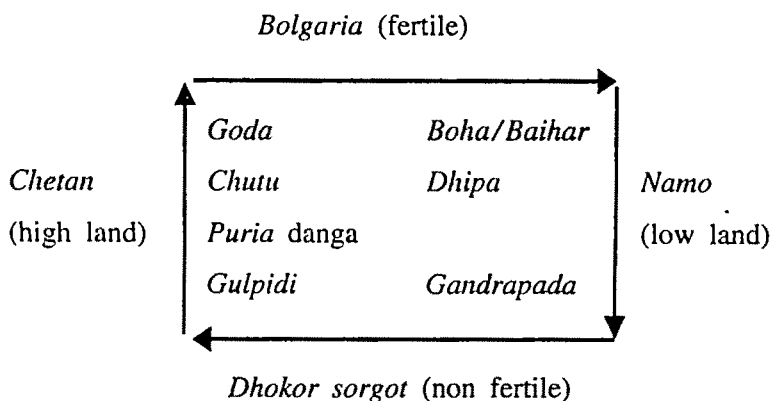


Fig. 1 : Paradigm of land types

Further they characterized the texture of *Murum* and *Githil* into three categories : *Mota* (coarse), *Katiz* (medium), *Dhuri / Mihi* (fine). These are not compared with any kind of measuring unit. They described the quantification and texture from mere approximation, experience, touch and feel of the soil with hands.

Each of the land types constituted of three kinds of *hasa*. They reported that these are *Baliar* type, *Balimatier* type and *Matier* type. Further the folk in question also distinguished different types of *hasa* according to colour. Those types are *arah* (red), *pund* (white), *jhinga* (saffron), *sasang* (yellow) and *hende* (black).

The perception of the land quality, texture of soil and fertility are amazing. This perception indicates the technological development and experience of the **folk** which are reflected from its pattern and use. Initially they categorized two kinds of land on the basis of ownership such as *Atu Baid* (village land) in which every villager had some right to use and other was *Aboa Baid* (own inherited land) that means the land of personal use.

There exists intercultural variation in perception of land level, texture of the soil, productivity rate and use pattern. The taxonomy of the folk shows inclusion and contrast of different objects within a semantic object. It indicates the range of culturally defined arrays into which it is categorized. An intercultural variation exists with respect to different attributes in conceptualizing environmental recourses. These intercultural variations add different significance to the same object in different cultures.

Land domain of the Ho :

Land domain of the **Ho** is named as *Asa*. The Ho classify the land in different stages. In the first stage the land is divided into two broad categories : *Diha* and *Keyar*. *Diha* is further classified into three types, viz. *Oapaima*, *Abakhai* and *Paria*. *Oapaima* land type is used as homestead land. They build up their houses or *Oah*. This land is in higher level than *Keyar*. The *Abakhai* land is

meant for *Bakai* or kitchen garden attached to their hutments. In this land they cultivate various types of vegetables or *Utu* such as *Ulo*, *Roinsa*, *Janhi* etc. mainly for household consumption. The third category of *Diha* land is *Paria* which is a non cultivable land where forest tree and various types of food bearing trees are seen. The *Keyar* land is the cultivable land. The *Keyar* land is further categorized into four types and mainly located in different levels. On the basis of height these four types of land hierarchically maybe placed in figure 2.

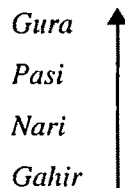


Fig. 2 : Shows the hierarchically placement of different land levels

Two main attributes of these categories of land are i) height of the land and ii) the fertility of the land. These two attributes are inversely proportional to each other that is with the increase of the height of the land the fertility decreases, The cultivation of the **Ho** in Muktapur village of Pallahara mainly depends on rain water, With the advent of rain the rain water trickles down from *Gura* land to *Gahir* land that is from higher level of land to the lower land level which offers good cultivation prospect. The *Gahir* land located at lower most level becomes highly productive because of the **soil wash** from *Gura*, *Pasi* and *Nari* land types to the *Gahir* land. This condition directs the **Ho** cultivators to start cultivation of short lived drought resistant variety of *Baba* or paddy in the lands of upper levels and the paddy of long duration variety are cultivated in *Gahir* land.

The Juango taxonomy of land :

The Juango cognized land as *Ekan*. They expressed that the *Samusin* (tree) immersed from *Ekan*. Juango taxonomy of *Ekan* is presented in Figure 3.

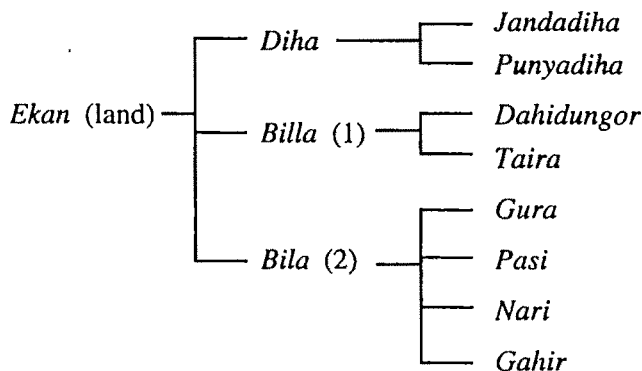


Fig. 3 Juango folk taxonomy of *Ekan*

The Juango folk taxonomy is of two stage classification of cultural cognition. In the first stage the main emphasis is on the use pattern of *Ekan*. Thus by *Diha* they denote those land where they build up houses. The term *Bila* includes different varieties of cultivable land. In the second stage of classification *Diha* is further categorized into *Jandadiha* which is the residential plot situated in the *Malyagiri* mountain and they used it in earlier days. *Punyadiha* is the residential plot in the plain which they use now. *Bila* (1) was cognized as *Dahi dungor* and *Taira*. These were the lands in hilly forest. They practised *Kamar* (shifting hill cultivation). The *Taira* land is better in terms of productivity. Juango ethno scientists through prolonged experimentation came to the perception that the *Taira* land was mainly suited to *Bua* (paddy) cultivation. The cultivators used their indigenous technological lore of cultivation to achieve the target of productivity. They noted that in the lowest land water was logged in very high quantity which made them inclined to sow the variety of paddy seeds which were relatively water resistant. Likewise, the folk members' knowledge and wisdom prescribed specific varieties for different land types for achieving optimum target. Besides, *Bara sulit* (a type of pulses), *Jhingari* (jonai), *Joani* (makai) were cultivated. The *Kamar* cultivation was followed in *Dahi dungor* land. The differentiating features of cultivation from *Taira* land were as follows: the forest trees in *Dahi Dungor* were smaller in height, the productivity is less in comparison to *Taira*, *Bua* was not cultivated, vegetables of different kinds were cultivated. *Bila* (2) refers to the different varieties of cultivable land. But there is paucity of knowledge regarding the main attributes of the three varieties of *Bila* (2) such as *Gura*, *Pasi* and *Gahir*. But they can identify which variety is better and which one is bad. All the names of *Bila* 2 are identified with Oriya terms and it was not possible for them to provide any Juango equivalent for the same.

Folk food cognition and food choice :

The author carried out field works in different villages located in forest hill regions of Jharkhand State, East Singhbhum district in particular. The villages are called by the "*purbi singhbhumian*" population as *Amainagar*, *Kadamdihi*, *Chakulia* and *Chapri*. These villages are multiethnic in nature and numerically dominated by the *Adibasi* like the **Santar**, the **Ho** and the **Kharia**. The other populations consist of the **Dhibor** (fishing community), the **Khumbhakar** (potter), the **Lohar** (ironsmith), the **Dom** (basket maker) and the **Tanti** (weaver) castes. The entire exposition of the work this time is confined to the cognition of *Adibasi folk* regarding food and application of ethnosience. The terms 'folk' and the 'villager' are interchangeably used.

Dietary pattern: prescription and proscription :

Dietary patterns of the *Adivasi folk* vary from man to man. Almost all the people mostly depend on rice as a staple food. According to the villagers, the stale rice has a medical value. To the villagers *Baske daka* (stale rice) is a

cold food and in summer season it keeps the body cool. In winter season they take *Rohar daka* (dry rice) to protect them from cold. The villagers have their own concept of prescription of the different food items. The villagers have a medical and logical concept behind the prescription of the dietary pattern. In the village *Chakulia* the villagers take meal in three times i.e., in the morning, noon and the evening (within 8p.m). But the old people and the children were exceptions. The old people generally take food only two times due to low digestive power.

Food prescription is variously idealized and observed with caution. Foods are avoided for a variety of reasons, such as fear of illness or any other native happenings. They believe that in a normal condition a person can consume a normal food without any visible effect, while in conditions like illness, pregnancy, puberty etc. it affects the body and the diet is automatically modified (Arnott 1975). In the village food supply is limited, avoidance of the available food can be detrimental to an individual's health. They think that the regular food should not be taken in times of illness. They think *Baske daka* should not be taken. They prefer hand made wheat bread or any other light food during illness. Coming to the question of food avoidance at puberty and menstruation, it was observed that most of the avoidance was related to women and mostly at infant age . (Clements, *et.al.* 1977) Before getting menstruation, during puberty, a girl is required to follow certain food avoidance. She abstains from eating *Jill / Jilu* (meat) as far as possible. However, a girl is considered to have come of age when she gets first menstruation period. According to conversant elderly women or *Dhaima* (midwife) a girl in the menstruation period is thought of as polluted, and in this period she cannot be related with any religious activities. Women belonging to this condition avoid the consumption of *Nimbu* (lemon) and *jojo* (tamarind), because consumption of those foodstuff is supposed to have different effects on menstruation Besides, at the beginning of the seventh or eighth month of pregnancy, the expectant mother is generally required to take light food only. Most of the aged females of the village believe that the milk, milk products are harmful for the healthy growth of the foetus and even it is dangerous, because the delivery of child may become difficult (Reid 1986). All types of *Lolo joma* (hot food) is generally tabooed from seventh or eight month of pregnancy. It is believed that consumption of hot food affects the *Demac* (temperamental) growth of foetus and also of mother. The pregnant women also avoid drinking of *Hanria* and *Mohua*. It is a belief among the female members of the village that drinking of *Mohua* and *Hanria* during pregnancy results the birth of a dead child.

Soon after the delivery of a child, there are certain food avoidances which the mother is expected to observe. She is not given cold food such as some fruits like banana, papaw and some vegetables like gourd, lady's finger etc. According to the villagers, the consumption of cold food affects

the health of infant. If the mothers take cold food, the infants are likely to suffer from cough and cold. They believe that breast milk determines the health of the infant. The mother therefore, has to observe caution in her dietary intake. There are a few food taboos observed in relation to the infant food. Generally, for eight months, the infant is not given any food. All other foods are avoided till the time the infants continue to depend on the breast milk. Both the milk of buffalo, goat and cow is, highly avoided for the infants (Laderman 1981).

After the delivery (during lactation) the mother also observed certain food avoidance, temporarily up to one month. The villagers consider the consumption of meat to be dangerous for both the mother and the child for a considerable period (generally up to two months) during lactation. The lactating women in the consumption of vegetable food also observed some avoidance. Almost all the women belonging to the village avoid eating papaw, palm, wood apple, banana, etc. It was believed that all these items are generally 'cold' and if the mother eats these foods, the baby would suffer from various diseases.

Preference of food: cultural and non cultural perspectives :

The general idea of food are variable in all societies. Thus some people prefer rice and some prefer wheat. This is the normal preference of food which is influenced by the culture of those people (Fitzerald 1986). How they entertain their guests by food items? How they make their special items? How they prepare their religious food offering to the God? All are cultural part of preference of food. Again food items which are the basic need or those items which are naturally available and edible, are the non cultural preferences (Bell 1931).

In the village *Chakulia* rice is the staple food. Maximum number of **Santar** and the **Ho** folk takes *Baske daka / Baske maddi* (stale rice) as their regular food and it was their main preferable food. Sometimes they take *Lolo daka / Rahor maddi* (cooked warm but dry rice). The practice of taking *sia daka / souia maddi* (rotten rice) is absent here but it is used to make *Hanria* (rice beer) in many houses, The folk arrange different types of rice hierarchically in terms of frequency of intake and preference.

Preferential perceptions about rice were viewed, which were completely dependent upon frequency of intake. They were not willing to arrange them according to *Sibila* (taste). According to the villagers *Baske daka / Baske maddi* was preferred mostly because it could be taken without any vegetable curry or fish or meat curry. For intake of *Baske daka / Baske maddi* onion and salt were necessary. This advantage was also economically supportive. On the other hand the intake of *Lola daka / Lolo maddi*, *Rohar daka / Rohar maddi* needed *utu* (vegetables), *jilu* (meat) or *haku* (fish) for consumption. (Sengupta 2003)

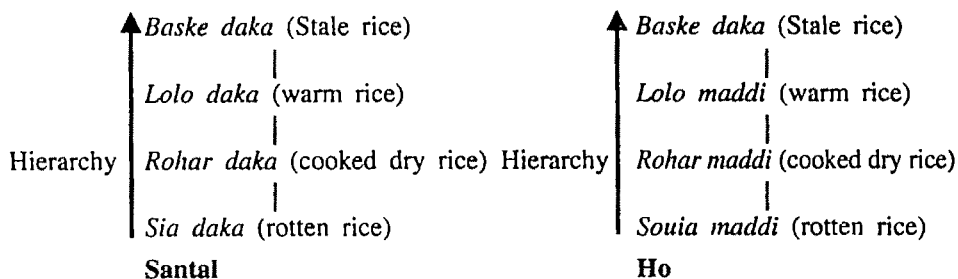


Fig. 3 : The folk hierarchical classification of various types of rice.

Preference of meat :

The villagers consumed *Jill / Jilu* (meat) as non-vegetarian food. A very few people disliked the *Merom jill / Merom jilu* (meat of goat). It is the most preferable meat. This has also got the religious importance because it is sacrificed in *puja* (worship). People who does not like mutton thinks that mutton causes pain in the bone joints. Many people prefer *Sim jill / Sim jilu* (chicken) than meat of goat. *Sukri jill / Sukri jilu* (pork) is the least preferable meat. Eating of raw meat is totally uncommon among these folks.

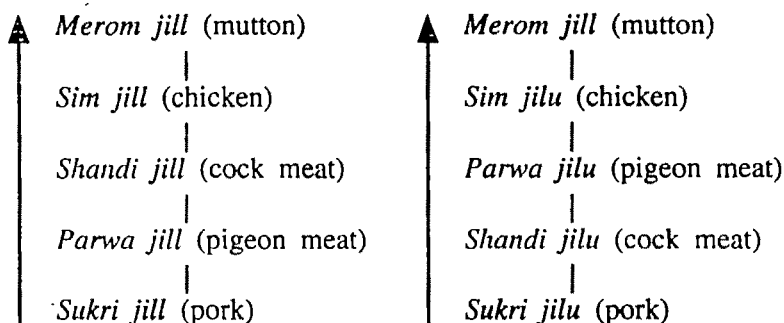


Fig. 4: Preferential hierarchy of meat among the folk.

According to the **Santar** and the **Ho**, goat meat which is locally known as *Merom jill* and *Merom jilu* are classified into two types : *Boida merom* and *Kith merom*. Generally they avoid the meat of *Boida merom*. According to hierarchical classification *Kith merom* is better than *Boida merom*.

The folk of the village classify the *Sim jill / Sim jilu* into three types i.e. *Bir sim* (which is found in the jungle), *Orah sim* (with is kept in the house) and *Farum sim* (poultry chicken).

Hierarchically the villagers prefer *Bir sim*, the *Orah sim* and lastly the *Farum sim*. The villagers classify *parwa jill / parwa jilu* into two types : *Asul parwa* (domestic pigeon) and *Patam parwa* (pigeon of jungle). Hierarchically the villagers prefer *Asul parwa* than *Patam parwa*.

Sukri jill / Sukri jilu is least choiced meat of the villagers. They classified *Sukri jill / Sukri jilu* into two categories viz. *Kith sukri* (small) and *Sera sukri*

(large). According to hierarchical preference they prefer *Kith sukri* than *Sera sukri*. According to the **Santar** and the **Ho** of **Chakulia** village, fish is termed as *Haku* and *Hai* respectively. They consumed different varieties of *Haku* / *Hai*. Generally they prefer *Sera haku* (big fish) than *kati haku* (small fish). They pointed out *Ruhi haku* (*Lebeo rohita*) as a tasty fish and placed it the top in terms of *sibila* (taste). *Ruhi haku* had a *Herem* (sweet) *sibila* (Sengupta and Kar 2004).

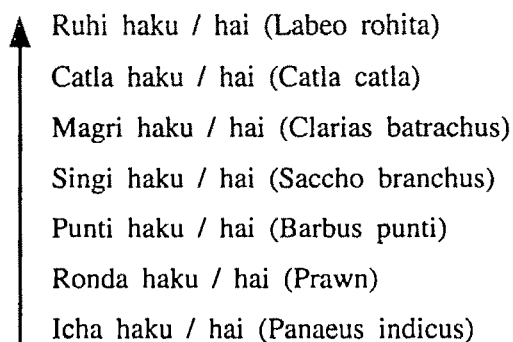


Fig 5 : Hierarchical classification of Haku / Hai according to sibila / nagod.

The folk perceive their ability to grow food items in their *Burgay* (kitchen garden) and sometimes bought in *haat* (weekly market). The preference of *Arak* / *Ara* according to *sibila* (taste) is as follows :

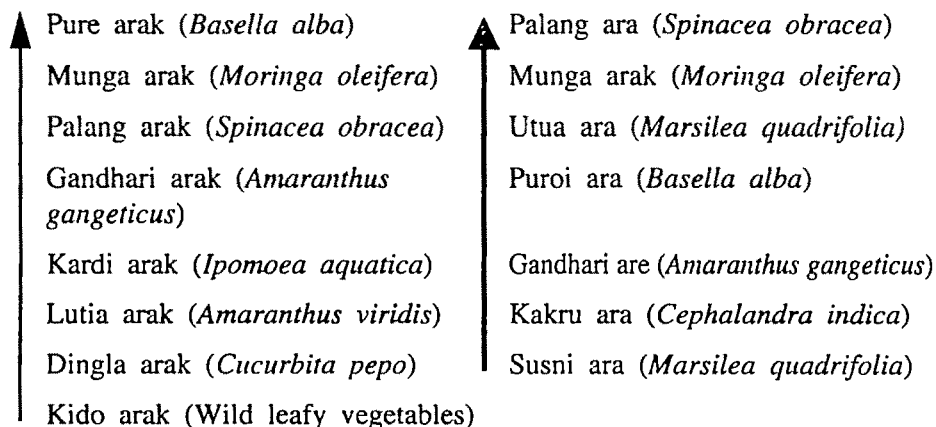


Fig. 6 : Hierarchical classification of Arak among the folk.

Preference of fruits :

More or less all the villagers like to eat fruits according to availability. The **Santar** termed the ripe fruits as *Bili* and the **Ho** termed as *Mata*. Generally they prefer *ul* (mango), *kaira* (banana), *mandar* (custard apple), etc.

A list of fruits are given below :

List of fruits	Santar	Ho
Mango	<i>Ul</i>	<i>Ul</i>
Banana	<i>Kaira</i>	<i>Mata kila</i>
Jack-fruit	<i>Kantar</i>	<i>Mata Kantar</i>
Custard apple	<i>Mandar</i>	<i>Ata</i>
Date palm	<i>Khejura</i>	<i>Kita</i>
Plum	<i>Didari</i>	<i>Bakra</i>
Guava	<i>Sukhram</i>	<i>Ambrut</i>
Lichi	<i>Lichu</i>	<i>Lichu jaw</i>
Berry	<i>Kuth</i>	<i>Kuth jaw</i>
Plam-fruit	<i>Tale</i>	<i>Tara jaw</i>
Papaiya	<i>Pipa</i>	<i>Bindidaaro</i>
Wood apple	<i>Sejo</i>	<i>Beldaro</i>
Cucumber	<i>Delta</i>	<i>Taiyar</i>
Hog Plum	<i>Ammra</i>	<i>Aambau</i>

Fig. 6 : Hierarchy in the service of food among the villagers

Food classification :

The folk classified the available food into two categories :

i) *Ising ka-te* (Cooked) food and

ii) *Berel te* (Uncooked) food.

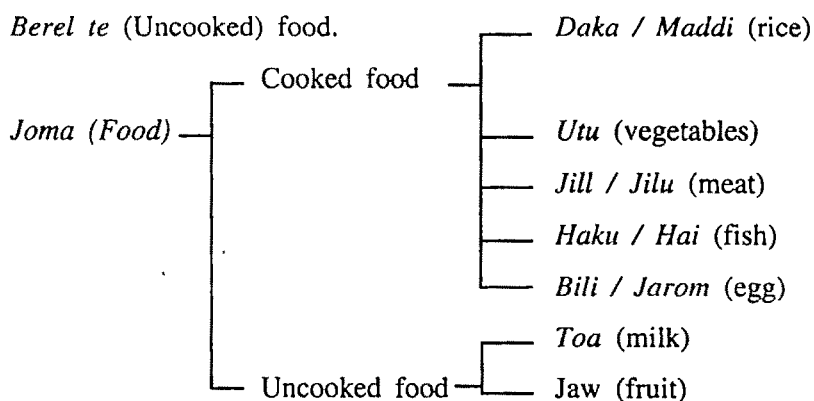


Fig. 7 : Food classification of the villagers

Regular and occasional diet :

The basic pattern of diet of the folk is same. But different members take different food at the time of their own traditional occasions. As these people live in the same area, their food habit is also very nearer to each other even

though little differences exist. The basic food types and some categories are shown in the figure 7.

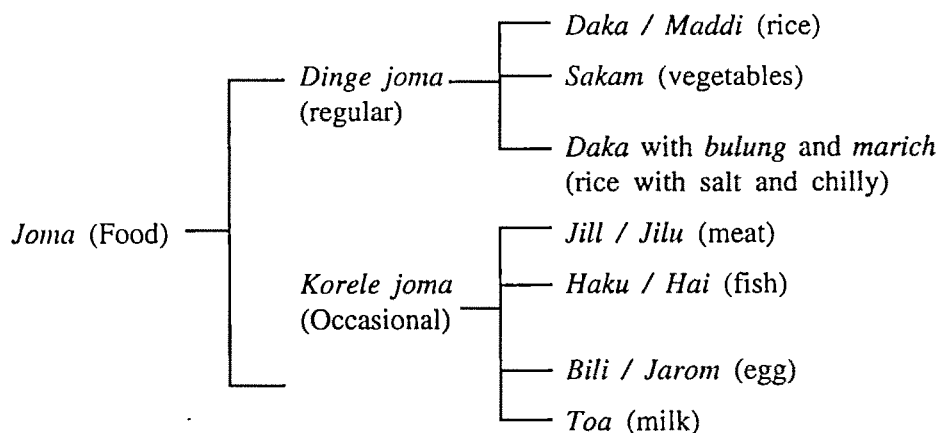


Fig. 8 : Regular and occasional categories of food.

Regular food :

The regular food of the folk is very simple. Maximum people take soaked rice with onion and chilly. Very few people prefer bread in winter season. But it can be said that rice is their staple food. As regular food rice, vegetables are taken by the villagers either in boiled form or as curry.

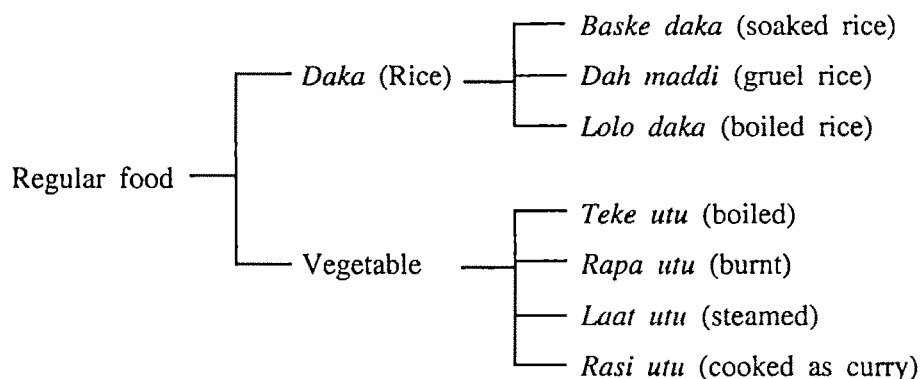


Fig. 9 : Basic categories of regular food.

Anthropology of food :

Chakulia is a village in the district of East Singbhum of Jharkhand and it is on the western side of Subarnarekha river. It is a multiethnic village. The village population consists of both tribal and non-tribal folks. All the casts and tribal communities do not exist in the same economic position and also do not earn their livelihood from the same set of resources. The villagers are of two agrarian classes :

- i) Land owner and ii) Land less.

The landowners utilize their resources and land less persons utilize them for their subsistence. The various resources in an around the village which the villagers utilize in the shape of pottery, distilling of country made liquor, selling of mohul flowers, work for stone-breaking in Pathar Khadan, basketry, shop keeping, service in copper mines (Bhatt 1977). In this present work different social, cultural, economic aspect of life are discussed here in the light of food materials. The work related to the fact that there exists different kind of preference of food among the members of folk but the basic preference that is *Baske daka* (stale rice) is fairly homogeneous throughout the people. There are various customs, rules, regulations that are followed by the people of *Chakulia*. Various kinds of classification are done among the food materials on the basis of different social, religious, economical and other aspects of social cultural Anthropology. They have very poor concept of nutrition and they define this concept of health and nutrition in their own way.

Getting of food is a major aspect of human efforts. Production and supply of food are always very important among these folk societies like many others. The need for food directed all kinds of economic activities. The food also indicated that the village population centering round food production, food provision, food preparation, food intake exhibited a kind of culture, which became the symbol of the folk. The two factors ecological and environmental were responsible to determine the range of potential food (Hyndman 1986). Culturally they were accustomed to intake *Baske daka* / *Baske maddi* (stale rice). It was preferred rather than *Rohar maddi* (dry cooked rice). The folk visit their resident friend's house and exchange *hanria* (rice beer) as matter of social obligation and friendship. The food habit chart of the whole day expressed the food choice mainly from *daka* / *maddi* (rice) and *arak* / *ara* (vegetables). Though this folk ate different kinds of animal protein food such as *jill* / *jilu* (meat), *haku* / *hai* (fish), and *billi* / *jarom* (egg) but during author's observation the presence of these kinds of items seldom were found which indicated that the economic factors were responsible for food choice and thus diet and nutrition.

The villagers believed that their health depend on the feeling of hungriness. They think if they go without food at the time of need, they will become weak and ill. Most of their food habits go with the tradition and food ways (Young 1986).

The villagers classified the food into hot and cold. Hot food are believed to produce more heat in the body. Cold foods are supposed to lower the heat production. They think that most of the foods are either hot or cold. *Mohua*, meat, fish, egg, etc. are considered as *Lolo* (hot food) and *Baske daka* / *Baske maddi*, banana, brinjal, plum, papaw, etc. are considered as *Riya* (cold food). Again, according to the folk people, some foods are itchy and some foods are windy. In *Santali* language the itchy food are termed as *Babat*. Prawn, egg, pork etc. are the example of itchy food and gourds, ginger, raddish, etc. are the example of windy food.

In the village, the **Santar** and the **Ho** categorized eight items of food : *Huru* (paddy), *Arak / Ara* (leafy vegetables), *Utu* (green vegetables), *Haku / Hai* (fish), *Jill / Jilu* (meat), *Bili / Jarom* (egg), *Toa* (milk) and *Jaw* (fruits). These items in different combinations and forms they consume. Most of the villagers do not consume milk. The villagers also classified the food into vegetarian and non-vegetarian. In *Santali* language the leafy vegetarian food is termed as *Ara sakam* and the non-vegetarian food is termed as *Mesasane*. The non-leafy vegetable food is also called *Utu*. The vegetarian food includes rice, pulses, etc. and the non-vegetarian food includes meat, fish, egg, etc. The dietary habit depends on body requirement. Generally the old man avoids to take pork, goat meat as they feel uneasy to digest these meat for their low capacity of digestion. Maximum number of people took stale rice as their regular food and it was their main preferable food. The practice of taking *Sia daka/Souia maddi* (rotten rice) was absent here. Stale rice was preferred most because it could be taken without any vegetable curry or fish or meat. According to the villagers, *Jill/Jilu* (meat) was consumed, as non-vegetarian food. Goat meat was most preferable meat and then chicken. Pork is the least preferable meat among the villagers. Generally they take *Sera haku* (small fish). More or less all the villagers liked to eat fruits according to availability. The **Santar** termed the ripe fruits as *Bili* and the **Ho** termed as *Mata*. Generally they prefer Mango, Guava, Jackfruit, Banana and Wood apple. In classification of plant foods the focus is on the part that is edible, e.g., fruit and root. Thus food classification is based on the part that is eaten (Rudder 1978/9:354).

Generally they take stale rice but when a guest comes to their house, they serve *lolo daka* (warm rice) to the guest along with meat or fish. It is a customary use to serve rice and meat to the guest. To welcome guests with different food items is a truly social aspect of life.

The choice of food was generally restricted to seasonal availability through cultivation and limited collection. They were concerned about whether the food was uncooked, hot or cold, sweet or sour as about what food was available. The classification of *Jill / Jilu* was closely parallel to that of animal kingdom. The hot-cold classification of food assumed importance by virtue of symbolic expression of its effect on body. This classification of hot and cold often served to control the consumption of food which might cause physical indisposition (Manderson 1986). The folks in question had a distinct conception of taste. The cognition of the *sibila* (taste) was reflected through various items of food consumed by them regularly and occasionally. In general, regarding the food habit of the *adivasi folk*, reflection of a standard image is maintained throughout, during the time of good supply. The traditional habits are continually followed. Similarly, observations show that there are several common food items in the same ecological region. Levels of living are low for the masses of poor folk. Regarding protein intake a tribal adult takes not a better amount on average. On the other hand the villagers get highest amount

of carbohydrate than balanced diet. In such the village people not only have to go for food but are dependent on its yearly and seasonal availability, which therefore affects their movements. However, the distribution and amount of the food that they eat is a controlling factor in distribution. Majorities of the poor villagers are to have the limited opportunity in the variation of food. It is seen that the *adivasi folk* as well as the caste people never like to consume wheat and milk. In author's opinion it is a must to teach them the better method of farming of a better quality of food. Again, two more additions are being suggested for the villagers to improve their dietary condition; firstly, all the homestead land must be provided with a kitchen garden, secondly, a hygienic and healthy kitchen room should be provided to every house. Regarding remedies one must suggest for the improvement of food standards; faulty selection of food, monotony in food intake and lack of knowledge have caused the nutritional deficiency despite the prime factor of poor economic stability.

Despite the prime necessity of life, the basic need of hunger, food has determined the growth, health and efficiency of the *adivasi folk*. At the same time some selected food has become symbols for special occasion. Again, social status, religions practices have influenced the selection of food. But it is dependent on the economic condition upon which the quantity and kind of food are dependent.

The case of forest hill tribes :

During the field work of 65 days the author emphasized works on Anthropology of food, paddy, money concepts, men-women categories and gender relations and categorization of natural resources as an aspect of folk taxonomic treatments. Among the forest hill tribes the Kharia, the Santar, the Ho, and the Munda are important groups who introduced themselves to the author as the *adivasi*. The author tried to grip the expression of this people regarding their perception of ecology, their adjustments to it, their principles of categorizations of the natural resources and their desire for their developments as programmed by the Govt. of India and the state. (Sengupta and Sengupta 2002).

Indigenous population is called in our country as *adibasi*. Their population is about 8% of total Indian population. This indigenous population otherwise called as tribe in India, is divided into many groups with different cultural identities with varied ethnic strains and culture. Each group through its pattern maintenance of culture, tension management in avid changed situations and through goal attainment is distributed in different parts of India with different numerical concentrations in different zones. The movements for *alchiki*, *kamtapuri* languages, separate existence of Jharkhand state and demand for *uttarakhand* and others are the expressions, reflected to the growth of indigenous people's own choice for their right of solemn living without being disturbed by the supreme dominance of the non-*adibasi* stream of population.

In view of this conceptualization of development the issues of indigenous population growth can be explained in its relationship with environment, resource utilization and development. There is enough empirical material to prove that the growth pattern of the indigenous population is smaller in size and easy enough to support within the given resources. The cases of *Amainagar*, *Kadamdihi*, *Chapri*, *Chakulia*, *Kumirmudi*, villages may be cited. The scarcity of goods and services for four decades of planned programmes of development for these people is not assessable. But for the use of goods and services by the indigenous population adequately means lack of approximation of optimal level. In comparison, though the population growth rate of indigenous people is slightly below the trend of general population stream, even then their population growth extends more demands for goods and services. Even then this demand seldom induces environmental damage. As the population growth of indigenous people is slow, continuous and low, it directly reflects low pressure on, natural resources like water, forests, lands, ecology, health and hygiene. Thus low population increase finds mild perceptible effects on poverty and environment. It is hardly explainable that they are the victim and the agents of environmental damage.

The indigenous population belonging to Austric speaking group with their various kinds of clan division and totemistic belief reflects utter saving of many plants and animals species which ultimately save natural resources for natural alternate growth. As these groups of peoples depend upon natural resources available in their surroundings together with their ecological requirements make them careful for utilization of environmental resources which ultimately make them very sensitive to environmental resources also. Their sensitization about resource utilization and interest on resources thus through pattern maintenance of their culture make them perceptible on different kinds of plants and animals species such as cultivated-uncultivated plants, protected and unprotected plants, wild edible and non-edible plants, sacred and non-sacred plants and so forth. Similarly among the animal species there are *Bir* (forest) and *Atu* (village), varieties of animal species. These are essentially indicative of their perception of sustainable environment with limited, careful and selective utilization of natural resources.

There is a general belief that some of these population practise shifting hill cultivation. They cultivate erosion prone land slopes of the hills. The crop yields on clear virgin forest drop sharply usually after a few years. They also practice felling of trees for fire wood which signals overusing of natural resources. In comparison with the east Singhbhumian Austric speaking groups the case of the Juango of Pallahara may be cited. The Juango of Denkenel district of Orissa oppose this view. The Juango in Pallahara use the hill slopes popularly known as *Ekan* to raise millets and other crops consecutively for three years and then leave these fallow for secondary growth to another two to three years to check the soil erosion for overusing the slopes. The fact of

slow growth rate of indigenous population never presents any problems regarding sustainable development and environmental problems. The three essential norms at all levels of developments are to lead long and healthy life, to acquire knowledge and to have access to resources needed for a decent standard of living. The very recent researches have opened up a new dimension to the concept of development of indigenous people. It has been added to the concept of "gender related development" and "gender empowerment measure" to evaluate the right to the progress of women. The data from the research for the evaluated inequality achievement between men and women of indigenous population pointed out that the disparity among their achievements decreased. The wisdom and knowledge of the "genius" among the indigenous population explain the achievement of men and women of their societies in three areas : (a) life expectancy, (b) educational attainment and (c) real income. They elucidate that the investment in female child education induces respective effects on families, communities and societies.

The field works in *Amainagar*, *Kadamdihi*, *Chapri* and *Chakulia* among the Austric speaking tribes and other castes of the East Singhbhum district of Jharkhand state bring into limelight newly achieved perception. The desire of the indigenous people as expressed and perceived by the author through several field works in these villages impinged the necessity of conceptualizing the development *de novo*. It must be community centric but equitably distributed and socially agreeable and environmentally sustainable.

The need of the participatory approach in the development is *de rigueur*. The classic checklist, their felt needs, their wisdom accumulated over generations are to be acknowledged, regarded and reshaped if necessary with active participation of research body at the grassroots level.

Santal *huru* as a primitive form of money :

When paddy (*huru*) production first started, there was as the author had seen, an objective necessity for the people to export in order to import the necessary means of production for agriculture; the means to protect themselves from the adverse climatic condition; the means to satisfy their need for symbolic expression in social relations (ceremonial adornments) and to ensure, their control over supernatural forces (magical charms). By reason of its variety of basic functions (subsistence, ideology), the exchange does not constitute a marginal activity an occasional supplement of the functioning of the people of *Chakulia*, but a strategic element of its structure. To go further, the author might say that these people could not subsist without exchange. The author arrived therefore, at the antipodes of primitive, so-called 'subsistence economies'. Many of them have to import raw materials to make their agricultural tools and equipment. Theoretically speaking in the ground of *Amainagar* and *Kadamdihi*, its example brings to light all the difficulties in the concept of surplus in the way as economists of classic Marxist schools often deals with it. It is not after being sure of their subsistence that the Santar

turned into exchange and selling of their surplus. In fact, paddy for them is a product primarily destined for exchange and therefore a commodity.

This merchandise has an exchange value primarily because it has a use value: it is consumable. Certainly, what amount of paddy is consumed by the **Santar**, the **Ho** and the **Munda** themselves is maximal; it is not because paddy is physically available, scarce but because it is exclusively an object of value. Therefore, paddy is a commodity whose use value is that of a highly-priced ritual object by its ideological and social significance as much as by its biological usefulness, its gastronomic flavour and the difficulties in production. Paddy is therefore a 'priced' commodity useful to ceremonial activities. Moreover, though paddy is not physically scarce among the Santar, the Munda and the Ho communities, it is among all groups who do not produce it and who also reserve it for ceremonial occasions and requirements.

A question emerges in author's mind that paddy is a priced commodity, but is it 'money'? In order for a commodity to function as 'money', it must be exchanged for a whole lot of other goods, it must function as a general equivalent for a lot. Paddy is exchanged for every commodity in day-to-day life essentially governed by the **Santar**, the Munda and the **Ho** communities living in the villages *Amainagar*, *Kadamdihi* and *Chakulia*. On the other hand, only paddy may run the whole gamut of possible conversions. Therefore, it functions as 'money'.

Paddy has a general equivalence and is an inevitable intermediary for the acquisition of all goods which are socially available or necessary. A general equivalence, do not imply a universal equivalence, since common consumption of goods, vegetables etc.; land and labour are not commodities and stand outside the sphere of 'paddy money' exchange. This general equivalence does not only apply to the **Santar**, **Ho** and the **Munda** but also their neighbours. **Santar** 'huru' is therefore, a primitive form of money and since it is 'primitive', this money offers an exceptional opportunity to prove the mysteries of the theory of value.

Santar "paddy money" and the basis for its exchange value : labour or scarcity?

In the light of the question: why a **Santar** exchanges paddy? The author found two answers neither of which excludes the other. First, he emphasized that he did not trade for himself alone, but also his wife or wives, his children, his brother's children and others. In this way he was referring to the importance of collective needs. On other occasions, on the contrary he referred complexity to the long and arduous work entailed in the production of paddy. According to author's observations in bargaining situations, the former type of argument was generally employed first.

The balance of exchanges is therefore primarily regulated by the volume of social needs. In any one exchange bargaining determines a position of equilibrium between supply and demand. If one of the other asks too much,

the transaction will be cut short. Nevertheless, bargaining or haggling is rare and generally each partner knows he must give in order to receive. The two act as if, there is a 'normal rate', a 'correct price' for the goods exchanged and this rate is known by the **Santar**, **Munda** and the **Ho** tribes and all their members. In this connection innumerable problems present themselves which the author can only touch on. For the **Santar** and the **Ho**, though their trade with other tribes is of vital importance, it is at the same time constantly threatened and interrupted by fluctuation in their political relation. For this reason, they did solely trade with groups who offered them the 'best prices'. Moreover, those tribes who offered the best prices frequently had little to exchange. Finally, another reason why some groups would trade their products for low rates with the **Santar** is due to their infrequent contact with them, their ignorance of the rates which other groups have settled with the **Santar** and their lack of knowledge concerning the terms of paddy production.

This is the very important example, because it shows exactly under what circumstances a 'normal' rate is established. It is fixed when regular and important exchanges exist between neighbouring groups who do not know the circumstances of production or the efforts required by their partner to procure the merchandise. It is not perhaps by chance, that the **Ho** describes those groups with whom they trade the most as being 'hard miserly'.

From this, the author has to throw light on the fundamentals of paddy value, which is as follows:

Why is it that the **Santar**, **Munda** and the **Ho**, knowing each other as they do and having lived always at peace with one another, consider this unequal rate as normal? (unequal to author's mind and in terms of the exchange of social labour).

The author suggests the following answer, which tallies with what have been told to the author: Paddy is dear because it is an 'essential' product and its production requires knowledge and magic which other neighbouring tribes also possess. The exchange is established on a level which expresses both the need and the labour involved (or the effort to procure a resource), but labour seems to play a secondary role; this could only be defined as a kind of minimum, below which the rate of exchange must not descend, while the need, the rarity of the product, could be defined at the maximum limit attainable.

'Primitive', therefore, does not mean 'simple' primitive reality which not only contains the seeds of some future, therefore complex and conditioned, but may also present 'developed' forms of social practice, the analogy for which may be found in other moments of historical evolution.

Exchange : money and profit :

The author has seen an unequal distribution of cultivable lands among the different members of the 'Atu' (Village). This situation does not mean unequal distribution of the paddy itself, since the owner allow their families, relations or friends the right to use temporarily or permanently their paddy lands, and

more especially since every person who harvests paddy is obliged to redistribute part of his takings. A widow, an old man, an orphan receive paddy and necessary goods etc. The 'interest rate' for example when paddy is borrowed in order to buy a livestock, reveals a fact which betrays the essence of the exchange process: no one accumulates paddy for the purpose of lending out as making profit. There is certainly a material advantage and moral prestige to be had from lending, but no profit is sought to the detriment of the debtor. The underlying principle in the aim of exchange lies in the satisfaction of social need consumption and not profit-seeking. Political authority and social prestige in a clan, lineage of an individual rests less on landed wealth or paddy than in ritual or cohesion, the numbers of wives and children. This tribal society recognizes a certain hierarchy of clans and individuals. Is it the same in the relations between the **Santar**, the **Ho** and their commercial partners, and does the profit which they draw from certain unequal exchanges signify exploitation of one group by another?

The answer seems negative for two reasons : the inequality, as is reported, lies in the unequal exchange of work. Now, with the **Santar**, as with most tribal societies, labour is not a scarce resource. Productive activities occupy, at least for men, only a part of time, available. What counts in group exchange is the reciprocal satisfaction of their needs and not a well kept balance of this labour expenditure. For this reason, the inequality of exchange expresses the comparative social utility of exchanged products, their unequal importance in the scale of social needs and the diverse monopolist positions of exchange groups. This is therefore inequality without the exploitation of man by man. Paddy exchange belongs to the sphere of the simple circulation of commodities. It constitutes a case of simple market economy welded to non market economy, based on the individual and collective works of direct producers, redistributing their products by way of kinship channels and neighbourly intercourse.

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Fuel and Forest : Crisis in the Traditional Energy

PROF. BUDDHADEB CHAUDHURI

In recent years, fuel energy crisis has been receiving increasing attention not only from developed countries but also from less developed countries. There is a growing awareness of the great danger accompanying rapid denudation of forests, indiscriminate utilization of non-renewable energy sources, over use of agricultural resources and so on. The increase in population together with the corresponding decrease of renewable energy resources worsens the situation of fuel shortage.

Fuel shortage is a symptom of a widespread ecological imbalance with social and economic consequences. The under developed and developing countries are likely to be most adversely affected by this shortage. Though many governments of the less developed countries as well as various social scientists are working to find ways of correcting these ecological imbalances.

Current situation :

The importance of wood as a primary energy source varies widely among different parts of the world. In Africa and Latin America 90% of wood used is for fuel purposes and in Asia, 65% but in Europe it stands at 25% and in North America, only 10 %.

World charcoal production cannot be estimated with any degree of accuracy because many countries do not provide adequate statistics. The Food and Agriculture Organisation's yearbooks of forest product include wood which is subsequently converted to charcoal. This generally estimates removal of fuelwood, but it is in fact dubious whether more than 18 million cubic metres of recorded fuelwood removed is currently converted into charcoal. Even in developed economies, the statistics of charcoal production are not always readily available and are often published in an ad hoc manner.

The substitution of alternative energy supplies for forest fuel in developing economies is by no means certain, and in many countries, the substitution process is not socially justifiable. Developed countries with adequate forests could also, with advantage, provide more energy from their indigenous renewal resources as a contingency against possible interpretations in the supply of fuel and power from fossil sources.

Fuel wood and charcoal can make the most immediate economic and social contribution to development in regions that have not completely utilized forests and whose indigenous energy resources are otherwise inadequate. As forests can sustain fuelwood supplies only if their provision is made under a conscious aim of management; it is essential for a country to have an active

forest energy policy. This policy should be formulated after an analysis of all relevant social and economic factors.

Statistics released by the Government of India show that out of 320.05 million hectares of India's total geographical area, 74.87 million hectares of land is under forest. But the official definition of forest also include the perpetually snow bound Himalayan area, deserts, extensively marshy, areas and the extremely degraded rocky areas. Hence even after making due allowances for all these factors only 46 million hectares are under actual forest cover. The increase in population has given rise to great pressure on land, leading to loss of forest area and tree crop. Moreover, various industries in their competition for producing raw materials (e.g. trees for the paper industry) destroyed natural forests which could have benefited the entire population. This shows how communities dependent on forests were denied of their livelihood.

The Energy Policy, and especially the Forest Policy of the Government of India was supposed to give rise to development with far-reaching consequences in the social, economic and political fields.

In operational terms, the government strategy for forestry entails :

1. Manning of reserved forests and sanctuaries by special corps of officers with the right kind of orientation.
2. Plantations with the objective of developing productive and protective forestry (to prevent soil erosion, land slides etc.) by agencies such as the Forest Development Corporation.
3. A massive programme of social forestry under the 'food for work' and such other schemes.
4. Plantation of fruit trees and their protection in areas inhabited by communities dependant on forestry.
5. Tightening of existing regulations and security arrangement in sanctuaries, including the complete ceasation of poaching.
6. Setting up of efficient intelligence machinaries for the prevention of smuggling of valuable species of flora and fauna and ensuring the personal interest of the top officials in such protective actions.
7. Revision of the system of contracting in such a way that the planting of trees outnumbers the felling of trees.
8. Vigorous campaign of afforestation by school and such other institutions.

Even though the government has announced a number of reformatory measures to improve the forest as well as ecological situation of the country, the performance of the agencies set up by the government has been largely insignificant. Mere adoption of good policies is of little value unless they are translated into actions by implementing agencies. The environmental situation

throughout the country is deteriorating at a very fast rate. Hence our country like many other developing countries, is in the grip of energy crisis. This is not only escalating the bills for importing fuel to the villages but also forcing the rural poor, especially the women, to walk increasingly larger distances in order to collect firewood. The ASTRA study showed that firewood accounted for over 80 per cent of the total energy resources used in the rural areas and with about 96 per cent of this resource being consumed domestically-82 per cent for cooking and 14 per cent for heating water. The same study also found out that 2.28 hours of women labor per day per household on an average is utilized in cooking alone. Forests-nature's greatest bounty to mankind and the most vital resource base for food, fuel, fodder and fertilizer are being denuded at an alarming rate. Overuse of forest resources has brought about a serious fuel energy crisis in the country, particularly with regard to the rural energy consumption pattern. Observation and field survey in different parts of India and in other developing countries show that a major part of workload all over the world is in relation to fuel collection and cooking. In such a situation, scarcity of cooking fuel means increased drudgery for women. Deforestation has thus subjected the rural folk, especially women, to a greater workload. The irony is that women are the victims of a phenomenon which was not caused by them.

Firewood, however, is not the only source of cooking fuel for the poor. Other bio-mass like animal dung and crop residues which supplement the wood supplies have also become scarce due to the commercialization of such traditional items in the wake of modernization of agriculture. Thus a poor man must struggle to ensure each day's supply of cooking fuel.

Given the dependence on non-commercial energy in various regions, study of the demand-supply situation of such fuel is important to an understanding of energy planning. One must understand the relation of the demand supply situation for fuel with the household size and income level as well as the sources of supply.

The Sixth Five Year plan envisaged 'intensification of efforts' to bring back ecological balance through massive afforestation programme and planned land utilization and soil conservation measures leading to more assuring agricultural future than present.

A social forestry programme had been suggested in order to stop rapid deforestation. Social forestry 'involves the people at all levels with raising forests as their own assets for their own use'. The main purpose is to provide forest goods and services in rural areas where these are the most needed. This objective is supposed to be realised through the establishment of multipurpose tree plantations that supply fuel and small timber to meet the basic requirements of rural communities, that provide food, fodder, shade and environmental

stability and generate income and employment by providing jobs and raw materials for cottage industries and other minor forest produce. The beneficiaries of this programme would be the rural poor. This programme is attempting to supply fuel, fodder, and timber for the village community.

The Government of India realised the need for introducing a public policy package for augmenting forestry. Over and above this, departmental activities of forest agencies such as the Forest Development Corporation and TRIFED were also advocated. But there was very little progress in actual implementation of these schemes. The large-scale felling of trees by the contractor-forester duo destroyed the purpose and their intervention continued unabated. The 'Chipko Movement' amply demonstrates that it is not the people who are to be blamed for deforestation but the improper measures pursued by the government.

Fuel shortage :

The failure in protecting and augmenting forestry contributed to the cooking energy crisis in the rural areas. The rising cost of coal and its irregular supply makes it virtually impossible for the middle-income groups living in small towns and cities to use coal as a medium of cooking energy. Thus they fall back upon softer options like fuel wood smuggled to the towns. This increased demand for fuel wood in towns, in turn, creates pressure on the rural energy system, on the one hand, leading to smuggling of forest produce, on the other.

Again, deforestation is not the only factor contributing to fuel shortage. The shortage of animal dung is another reason which has not been paid much attention. Due to expansion of agriculture, grazing land has shrunk leading to a decrease in the cattle population. Moreover, the increasing use of animal dung as manure leaves little to be used as a substitute fuel. Of late, animal dung and even crop residues are being used in gasfire. Thus the improvement and expansion of agriculture and the alternative use of traditional fuel items, add to the rural energy problem and consequently increase the drudgery and workload of rural poor.

Growing fuel shortage may also reduce household income and consumption because of the increase in relative share of the cost of fuel in the disposable income of the household. Again, a person who has to spend greater time in gathering fuel may have less time of work for a wage in order to acquire other goods for consumption. So the shortage and price of cooking fuel adversely affect both the income and consumption pattern and the general welfare of the household. The shortage of cooking fuel is indeed, an issue of alarm today. While the Forest Ministry estimated a 300 million tonnes need of fuel wood in A.D. 1990, the fuel wood production, in the forest amounts to a mere 120 million tonnes per annum. Since the scope of alternative energy

sources is also limited, the cooking energy crisis throughout the country would assume a much greater proportion in the near future.

Concern regarding the aforementioned problems have led to this scientific enquiry into rural fuel energy system as well as the life and the living of the rural poor.

Planning is essential for the protection of the finite and the creation of renewable resources. The forest is a resource, which, cannot be left to market forces to control without the proliferation of undesirable externalities. Planning, by adequate reservation areas of forest for the future fuel requirement of the people, ensures that the benefits of land clearance and settlement are not lost. New developments including, hydro-electric schemes and new infrastructural links usually involve clearing and burning forests. For the long term benefit of the people, governments must ensure that there is sufficient fuel at a price that consumers can afford. Planning shall guide to the policy makers regarding the maintainance of renewable forest resource. A resource having great potential for raising the material and cultural standards of mankind and for ensuring that the environment is safeguarded for the benefit of the succeeding generations.

In managed forests the provision of fuelwood and building poles is sometimes inhibited by the fact that silvicultural work usually aims at producing the maximum quantity of wood for industrial use and sometimes even quality timber.

The production of high-grade timber by the most efficient methods may be the primary objective of the management and if it is done in a well planned manner, it may even satisfy a variety of different claims on the forest. The reconciliation of various interests was achieved in Uganda by a system evolved for increasing the productivity of tropical forests at minimal cost by converting unwanted vegetation into charcoal and filling up the gaps thus created with 'desirable' trees (Earl : 1968). This system was cheaper environmentally, more desirable and provided benefits to all sections of people.

The policy of replacing natural forests of low productivity by plantations with a greater propensity for growth accords with the basic aim of those who seek to make the best use of available resources. However it is often carried out without enough concern for environmental consequences. This narrow view of forest management encourages the replacement of mixed forests by mono cultures and may result in a loss of soil fertility and the social and amenity values of forests.

Common features of some developing countries are low commercial energy consumption, high forest energy consumption, and a large, but rapidly decreasing forest resource. In each of these countries there is great difficulty in finding enough money to pay for silvicultural management of the forest.

The consequences are that vast areas of natural forest are being mined for timber and the opportunity for increasing their potential to provide for timber and for fuel in the future at marginal cost is being irretrievably lost.

Fuel shortage, though much talked about issue, still remains impressionistic assertion not backed by adequate data. It is therefore important to build up the data reserve by quantitative survey of the rural households. Fuel shortage is sought to be made up by the afforestation programmes launched in the countryside social forestry being one. It would be interesting to study the actual need of fuel for a family vis-a-vis the availability of traditional fuel items without and with the forest vicinity keeping in view recent programme such as that of social forestry. The study includes the details of the fuel items used by the households, the source of fuel as well as the modus operandi of household fuel production. It is not a comprehensive study in the sense that it narrows down its focus to the lowest strata of the society, the economically handicapped, the landless or households owning very little land. The study envisages arriving at an approximation about types and quantities of fuel needed for a family and the demand-supply lag of fuel and the question of whether the gap may be filled in through such treatment as social forestry. In many places, to overcome forest degradation, afforestation programmes have been implemented and certain varieties of trees have been planted often as a part of social forestry programme. It is to be seen, how far these plantations have really helped the local people to meet their various needs, particularly fuel. In this paper some of these issues have been examined.

Area of Study :

Indian countryside is not yet developed enough for the population inhabiting the villages to use the heavily priced fuel for domestic purpose. These villagers use fuel in different forms for their domestic use and extensively use local forest for their household requirements. Forest has provided the dwellers the much-needed fuel for cooking and other uses. Forest dwellers use the forest resources not just for domestic food processing but also for making crude furniture. In addition, forest has been used for house building as well. Forest and fuel is interrelated. People use leaves and dried up branches of twigs for cooking and food processing.

A study was conducted in West Medinipur district, West Bengal. The study clearly revealed data such as requirement of fuel, types of fuel and time to collect fuel etc. The type of fuel used by households depends largely on eco-system of the surrounding forest. Fuel wood varies from one place to another. Villagers being poor, depend on collecting fuels from surrounding forest areas. In addition to collection, villagers make dung cake and dung sticks to be used as fuel. These are widely used by the local people in the villages.

Villages under study were Baghari, Chandavilla, Hatiasuli and Kukurmuri all in West Medinipur district. The villages were inhabited by some tribals and castes people of Bengalee Hindus. Castes included Bhuniya, Brahmin, Gandha Banik, Kumar, Karmakar, Mahato and Sadgope, Tanti. The tribals included, Santals and Bhumij.

Bagghari : It may be called twin village of Chandavilla. Though Bagghari is adjacent to Chandavilla, it is a tribal dominated village. The major population is constituted of Santals and the rest are the Mahatos.

Chandavilla : Peoples of three Hindu caste groups, Bhuniya, Brahmin and Mahato are the inhabitants of this village. The major populations are Bhuniya, and Mahato. Only three Brahmin families inhabit the village. The village Chandavilla is situated at 18 kms. from Jhargram town.

Hatiasuli : It is a multi-caste village with some tribal population. The different castes are Gandha Banik, Kumor, Karmakar, Sadgoap and the tribals are Santals and Bhumij. The village is 21 Kms. west from Jhargram town. There is a road connection from Jhargram but this village is situated far from this road. Cycling and walking are the two conspicuous ways of communication with the road.

Kukurmuri : Kukurmuri is a tribal dominated village with some Tanti population. The Santals comprise the main population here. The village is situated 18 Kms. west of Jhargram town.

Table 1. Caste/Community wise Family in Studied villages.
(No. of families)

Villages	Caste/Community										Total
	Bhuniya	Brahmin	G. Banik	Kumar	Mahato	Karmakar	Sadgopa	Tanti	Bhumij	Santal	
1. Baghari	—	—	—	—	5	—	—	—	—	18	23
2. Chandavilla	15	3	—	—	10	—	—	—	—	—	28
3. Hatiasuli	—	—	10	64	—	2	5	—	30	13	124
4. Kukurmuri	—	—	—	—	—	—	—	4	—	30	34
Total	15	3	10	64	15	2	5	4	30	61	209

There are 209 families in the four villages. The number of families in villages are; Bagghari-23 Santal (78%) and 22% Mahato. Chandavilla is a mixed village. Bhuniya and Brahmin live along with 10 Mahato families. Chandavilla is small but reflect Bhuniya dominance, a sizeable Mahato families

also live in the village. 124 families live in Hatiasuli. A large number of Potters (64 families) live in Hatiasuli. They are called Kumar according to Hindu ideology. Bhumij, a larger tribal group with 30 families (about 24 %) and Santals in Hatiasuli constituted 38.28% of the total families. Kukurmuri, a small village tribal dominated.

Types of Fuel :

Every household uses a certain amount of fuel for cooking and food processing. In our study, people used different types of fuel depending on the availability in the surrounding environment. In general wood, wood plus leaves and leaves are used abundantly as fuel for household purposes. An estimation has been attempted through table-2 regarding the use of fuel.

Table 2. Different types of fuel used by different caste/communities in different villages.

Village	Caste/ community	Fuel type				Total
		Wood	Wood+leaf	Leaf	Others	
Bagghari	Mahato	–	5	–	–	5
	Santal	–	14	4	–	18
	Total	–	19	4	–	23
Chandavilla	Bhuniya	3	12	–	–	15
	Brahmin	3	–	–	–	3
	Mahato	2	8	–	–	10
	Total	8	20	–	–	28
Hatiasuli	G.Banik	7	3	–	–	10
	Kumar	11	53	–	–	64
	Karmakar	–	–	2	–	2
	Sadgoap	2	3	–	–	5
	Bhumij	2	22	6	–	30
	Santal	3	6	4	–	13
	Total	25	87	12	–	124
Kukurmuri	Tanti	–	4	–	–	4
	Santal	3	18	9	–	30
	Total	3	22	9	–	34

Wood and leaves were collected from the afforested plants viz. Eucalyptus, Sal, Ārjun, Akasmoni etc. These are all quick growing species. Our primary concern here is the exposition that use of eucalyptus has serious effect on human eyes since burning of eucalyptus emits excessive fumes which makes the environment uneasy while cooking in a closed kitchen particularly. Afforested plantation mainly consisted of Eucalyptus. Some families used better type of fuel which comprised of wood. However a majority used wood and leaves as fuel shown in the table.6. Depending exclusively on wood as fuel may be an indicator of better fuel use since leaves emits maximum fume. The Brahmin families used wood only and did not collect it themselves. They purchased from market. In Hatiasuli village an interesting picture was found. Among the Gandha Baniks, 70% use only wood for fuel while 30% use both wood and leaves. Among the Kumor, 17% depend on wood only and 83% on wood and leaf. Interestingly, Karmakar uses only leaves as fuel. They are so poor that they could not afford to purchase fuel. They collected fuel from the neighboring areas. Among the Sadgopes out of 5 families the ratio of fuel use was found to be at 40% dependence on wood only and 60% using a mix of wood and leaves. The Bhumij Tribals used three categories of fuel in different degrees. 7% depended on wood, 73% on a mix of wood and leaf and 20% depended largely on only leaves as fuel. The Santals used wood-23%, 46% depended on wood and leaves and 31% depended on leaves alone.

In the village Kukurmuri, 4 Tanti families used wood and leaves for domestic fuel while Santal in the same village, 10% used wood as fuel and 18 families amongst the 60% depended on wood plus leaves while 30% families depended heavily on leaves as fuel sources.

Thus variation of fuel-use depends on availability of the type of fuel. Most families used mixed fuel consisting of wood and leaves. Slightly better off families may depend on wood exclusively. As a consequence, a local fuel market has emerged in the locality. The effect of the extensive use of such fuel has adverse effects on the eye of women and children who help their mother in cooking. The green firewood (not dried up properly) emits more fumes and poses grave health hazards.

Collection of Fuel :

Fuel collection is done not only by adult but it also involves the minors. In rural areas, fuel collection is essential since there is no coal or kerosene. Wood and related sources are mainly used abundantly as fuel in rural areas. In some areas, declaration of common land as forest has given rise to controversies. Increasing restrictions has deprived the forest dwellers from their right to collect fuel.

Table 3. Fuel collection by caste/community, gender, age group and village:

Village	Caste/ community	Fuel Collected by					
		Male			Female		
		Minor	Adult	Total	Minor	Adult	Total
Bagghari	Mahato	–	–	–	1	5	6
	Santal	–	7	7	5	23	28
	Total	–	7	7	6	28	34
Chandavilla	Bhuniya	3	2	5	2	16	18
	Brahmin	–	–	–	–	–	–
	Mahato	–	–	–	3	14	17
	Total	3	2	5	5	30	35
Hatiasuli	G.Banik	4	3	7	5	9	14
	Kumar	19	14	33	27	68	95
	Karmakar	–	–	–	1	2	3
	Sadgoap	2	1	3	2	4	6
	Bhumij	1	9	10	13	31	44
	Santal	2	5	7	5	13	18
	Total	28	31	59	53	127	180
Kukurmuri	Tanti	1	–	1	1	6	7
	Santal	7	17	24	9	30	39
	Total	8	17	25	10	36	46
Total		39	57	96	74	221	295

The women, including the minor girls are more involved in the collection of fuel. As the forest is degraded, it takes more time to collect fuel. They are forced to cover a longer distance resulting more burden, pressure and obvious risk.

Time Required for Fuel Collection :

Time required for fuel collection is an indicator of the time and energy devoted to fuel collection by different caste/communities. This study deals with two time periods : past and present. Duration of fuel collection ranged from ½ hour to 2 hours. It has been discussed in Table-4.

Table 4. Time required for fuel collection

Village	Caste/ community	Time Required for Fuel Collection (h = hour)									
		Present					Past				
		½h.	1h.	1&½	2h.	Total	½h.	1h.	1&½	2h.	Total
Bagghari	Mahato	4	–	–	–	4	2	–	–	3	5
	Santal	11	–	–	7	18	5	–	–	13	18
	Total	15	–	–	7	22	7	–	–	16	23
Chandavilla	Bhuniya	11	–	–	4	15	–	3	–	12	15
	*Brahmin	–	–	–	–	–	–	–	–	–	–
	Mahato	8	–	–	1	9	–	3	–	7	10
	Total	19	–	–	5	24	–	6	–	19	25
Hatiasuli	G.Banik	10	–	–	–	10	–	10	–	–	10
	Kumar	58	–	–	–	58	–	64	–	–	64
	Karmakar	2	–	–	–	2	–	2	–	–	2
	Sadgoap	4	–	–	–	4	–	5	–	–	5
	Bhumij	21	9	–	–	30	–	19	11	–	30
	Santal	7	5	–	–	12	–	9	4	–	13
	Total	102	14	–	–	116	–	109	15	–	124
Kukurmuri	Tanti	4	–	–	–	4	–	3	1	–	4
	Santal	27	3	–	–	30	–	11	19	–	30
	Total	31	3	–	–	34	–	14	20	–	34
Total		167	17	–	12	196	7	129	35	35	206

*Do not collect any fuel wood

In Bagghari village, duration of fuel collection decreased for 2 households. Hence, we find 4 households took ½ hour to collect their fuel. These households belong to the Mahato community. The reduction in fuel collection time may be due to afforestation to revamp the forest cover. The details of time of fuel collection may be seen in Table. 4. The time of fuel collection shortened in many cases of the Santal households. There is an increasing number of families having less time due to increased forest generation programme. Around 61.11% households took ½ an hour to collect required amount of fuel. Earlier it would have taken more than 1 hour. Earlier 72.22 % households among the Santals took 2 hours to collect the daily requirement of fuel. A similar increase has been found in the total column

of the said village. So, the trend has been reduction in time of fuel collection for all caste/communities. Such incidence has also been found in Chandavilla, Hatiasuli and Kukurmuri villages.

Requirement for Fuel :

The requirement of fuel needed by households is reflected below on the basis of caste/communities. Fuel is measured here by Bundle. The requirement of the bundles of fuel for the families is the crude assessment of fuel requirement. Each village has differential amount of fuel use. Also the number of households in each village are not equal. So the requirement will also be varied. Also the use of fuel by households varies to a great extent depending upon the item of food prepared. Some households may show more requirements than others depending on the quantity of food and item of food prepared. Less items of food would require less requirement of fuel.

Table 5 : Requirement of fuel

Village	Caste/ community	Requirment of Fuel / Month (Bundle)					
		30	45	60	75	90	Total
Bagghari	Mahato	–	1	2	1	1	5
	Santal	3	3	11	–	–	18
	Total	3	4	13	1	1	23
Chandavilla	Bhuniya	–	7	8	–	–	15
	Brahmin	–	–	1	1	1	3
	Mahato	–	2	7	1	–	10
	Total	–	9	16	2	1	28
Hatiasuli	G. Banik	–	2	7	1	–	10
	Kumar	4	5	47	6	2	64
	Karmakar	–	1	1	–	–	2
	Sadgoap	–	3	2	–	–	5
	Bhumij	7	20	2	1	–	30
	Santal	7	5	1	–	–	13
	Total	18	36	60	8	2	124
Kukurmuri	Tanti	–	3	1	–	–	4
	Santal	8	22	1	–	–	30
	Total	8	24	2	–	–	34
Total		29	74	91	11	4	209

In the first village Bagghari, Mahato and Santals use varied amounts of fuel bundle. Mahatos do not use fuel evenly. On an average, 66 bundles of fuel were required by each household of Mahato. Santals required 49 such bundles on an average by each household.

In Chandavilla, also, caste/community wise variation can be noticed with regard to fuel consumption. Bhunia on average required fuel of 53 bundles of fuelwood. Brahmin needed 60 bundles by 1 family and the other 2 families required 75 bundles and 90 bundles per month respectively. On an average, Brahmin required 75 bundles a family per month. Among the Mahatos 20% of the families required 45 bundles each. Another 7 families required 60 bundles each in a month and 1 family needed 75 bundles of fuelwood in a month. Average use may be said to be about 58.5 bundles a month by a Mahato family. In Hatiasuli, Gandha banik's requirement of fuel was 58.5 bundles on an average per month. Kumor families' requirement was 56.5 bundles. Karmakar needed 52.5 bundles per month. Sadgoap showed a need of 51 bundles of fuel per month on average. Bhumij, the tribe had required 43.5 bundles on an average per month for fuel and 38.07 bundles were needed for the Santal family by one month, on an average. In Kukurmuri, Tanti required 48.75 bundles in average per month for fuel consumption. Among the Santals, this stood at 49.4 bundles per month.

Thus it may be observed here that fuel wood consumption is higher among the Brahmins and hence crisis is much more among them. Followed by them are the Mahatos who showed 66 bundles of average fuel consumption.

Managing of fuel :

Managing of fuel means, in general, fulfilment of fuel need by a single household in a day or month. Fuel management refers to how the people get the daily requirement of fuel and how the purchased fuel quantum is substituted by collected fuel. In fact, the different modes of meeting fuel necessity is basically termed as fuel management. Table 6. shows three basic modes of managing fuel in the present context. Fuel may be acquired by purchase, collection and both purchase and collection.

Table 6. Managing of fuel (present)

Village	Caste/ community	Managing of Fuel (present)			
		Purchased	Collected	Purchased & Collected	Total
Bagghari	Mahato	1	3	1	5
	Santal	–	18	–	18
	Total	1	21	1	23
Chandavilla	Bhuniya	–	15	–	15
	Brahmin	3	–	–	3
	Mahato	1	9	–	10
	Total	4	24	–	28
Hatiasuli	G. Banik	–	10	–	10
	Kumar	6	49	9	64
	Karmakar	–	2	–	2
	Sadgoap	1	4	–	5
	Bhumij	–	29	1	30
	Santal	1	11	1	13
	Total	8	105	11	124
Kukurmuri	Tanti	–	4	–	4
	Santal	–	28	2	30
	Total	–	32	2	34
Total		13	182	14	209

In Bagghari village, of the 5 Mahato families, 1 family depended exclusively on purchase of fuel, 3 families collected fuel and one family managed partly by purchase and partly by collection. 18 Santal families managed fuel primarily by collection. In village Chandavilla, Bhunisa depend entirely on collection of fuel. 15 families among them adopted collection as modus operandi of fuel management. 3 Brahmin families depended entirely on purchase of fuel. On the contrary, Mahato families of Chanda villa also depended largely on collection although 1 family depended on purchase of fuel. In Hatiasuli, 10 Gandha banik families depended on collection only to manage fuel needs. Among the Kumors, a large number (49 families) depended on collection while 6 families

depended on purchase and 9 families adopted both ways. Karmakar depended on collection only. Of the 5 Sadgopes, only 1 family purchased fuel while the rest depended on collection. Among the Bhumij, a considerable number of families 29 (96.67%) out of 30 families depended on collection of fuel and 1 family adopted a mixed approach. The Santals also adopted collection as major way of fuel management while 1 each depended on purchase and both collection and purchase simultaneously. In the village Kukurmuri, Tanti and Santal live side by side; 4 Tanti families collected fuel while in case of Santal 93.33% families depended on collection and 6.67% families adopted both the methods simultaneously.

Table 6A. Managing of fuel (past)

Village	Caste/ community	Managing of Fuel (past)			
		Purchased	Collected	Purchased & Collected	Total
Bagghari	Mahato	–	5	–	5
	Santal	–	18	–	18
	Total	–	23	–	23
Chandavilla	Bhuniya	–	15	–	15
	Brahmin	3	–	–	3
	Mahato	–	10	–	10
	Total	3	25	–	28
Hatiasuli	G. Banik	–	10	–	10
	Kumar	–	57	7	64
	Karmakar	–	2	–	2
	Sadgoap	–	5	–	5
	Bhumij	–	30	–	30
	Santal	–	13	–	13
	Total	–	117	7	124
Kukurmuri	Tanti	–	4	–	4
	Santal	–	30	–	30
	Total	–	34	–	34
Total		3	199	7	209

In the past fuel was mostly collected by except Brhamin at Chandavilla and 7 Kumors who had, in the past, depended partly on purchase and partly on collection. Almost entire families of the sample except 10 families used to collect fuel as and when required. In the subsequent years, many families adopted other ways besides the collection perhaps due to monetary benefits and through developmental effort. There was an improvement in the economic condition of some families and now a larger number of families could afford to purchase fuel or as more fuel was required for certain economic activities like pot-making.

Table 7 : Purpose of fuel use

Village	Caste/ Community	Purpose of Use				
		Cooking	Rice Processing	Pot Making & Cooking & Collected	Cooking, Rice Processing & Preparation of 'Muri'	Total
Bagghari	Mahato	1	4	—	—	5
	Santal	3	15	—	—	18
	Total	4	19	—	—	23
Chandavilla	Bhuniya	7	8	—	—	15
	Brahmin	2	1	—	—	3
	Mahato	2	8	—	—	10
	Total	11	17	—	—	28
Hatiasuli	G. Banik	1	7	—	2	10
	Kumor	7	42	15	—	64
	Karmakar	—	2	—	—	2
	Sadgoap	—	5	—	—	5
	Bhumij	11	19	—	—	30
	Santal	2	11	—	—	13
	Total	21	86	15	2	124
Kukurmuri	Tanti	—	4	—	—	4
	Santal	9	21	—	—	30
	Total	9	25	—	—	34
Total		45	147	15	2	209

In Bagghari village. Mahatos used fuel for cooking and rice processing. Santals revealed only 3 households that cooked with the help of fuel and 15 households who both cooked and processed rice with the help of fuel. In Chandavilla, of Bhuniyas, 7 households cooked only with fuel and 8 families constituting 53.33% used fuel for both rice preparation and cooking. Among the Brahmin, 66.67% families used fuel cooking while 33.33% families used fuel for cooking and rice processing. 20% Mahato families used fuel for cooking and 80% families of them used fuel for rice processing and cooking as well. In Hatiasuli, Gandha banik used fuel for rice processing and cooking. 10% among them used fuel for cooking alone. 70% used fuel for rice processing and cooking. 20% families used fuel in extensive ways such as fuel for cooking, rice processing and preparation of puffed rice. Karmakar showed 2 families using fuel for rice processing and cooking. All families of the Sadgoap used fuel for both rice processing and cooking. Bhumij used fuel for cooking by 36.67% families and 63.33% families used fuel for both rice processing and cooking. Among the Santals, the percentages are 15.38% for cooking alone and 84.62 % using fuel for both rice processing and cooking. In Kukurmuri, Tanti families used fuel for both rice processing and cooking and of the Santals 30% families used fuel for cooking alone while 70% of Santals used fuel for both rice processing and cooking.

Types of fuelwood :

Various types of fuelwood were used by the villagers. Most notable among them are Eucalyptus, Sal and various types of Eucalyptus. Eucalyptus is a common species that constitutes main component of afforestation programme nowadays. It is a quick growing species. It has serious impact upon the health of the people. In our study, people using Eucalyptus as fuel are reported to suffer from serious health hazards. The type of plants that are used as fuel include Sal, Sonajhuri, Eucalyptus and some others not known. People living in the village have to depend upon fuelwood, leaves, and jungle bush. In table no. 8 a caste/ communitywise types of different trees used as fuelwood has been discussed.

In Bagghari village, 60% of the Mahato families used eucalyptus as fuel wood; 20% used sal and eucalyptus mixed and another 20% used eucalyptus with various types. Of the Santals, 38.89% used eucalyptus while 11.11% used a mix of sal and eucalyptus while 50% of Santals used various types with eucalyptus. In Chandavilla village, of the Bhunia 33.33% used eucalyptus; 13.33% used sal and eucalyptus mixed and 53.33% of them used eucalyptus with various types. Again, 33.33 % Brahmin used eucalyptus, 66.67% of them used sal with eucalyptus. Mahatos used eucalyptus (20%) and 10% used sal and eucalyptus mixed while remaining 70% used eucalyptus with various types. In Hatiasuli village, among the Gandha baniks, 10% used eucalyptus, 60% used

a mix of sal and eucalyptus as fuel and 30% of them used eucalyptus and other types as fuel. Among the Kumors 10.94% used eucalyptus solely and 40.63% used both sal and eucalyptus and 48.44% used eucalyptus with various types. Karmakar used eucalyptus with various types as fuel source and 40% Sadgoaps used sal and eucalyptus while 60% used eucalyptus with various types. Of the Santals, 38.46% used sal and eucalyptus and 61.54% families used eucalyptus and the various types. In the village Kukurmuri, 25% Tanti used eucalyptus. 25% families used Sal-eucalyptus and 50% of them used eucalyptus with various types of fuelwood. Santals used 6.67% eucalyptus, 36.67% used Sal-eucalyptus and 56.67 % used various types of fuel along with eucalyptus. This, in short, is the scenario of fuelwood use in the villages.

Table 8. Different types of Fuel wood used (present)

Village	Caste/ community	Fuel Wood Used (Present)						
		Sal	Sal So- njhuri	Eucal- yptus	Sal Euc- alyptus	Various except Eucalyptu	Various with Eucalyptu	Total
Bagghari	Mahato	-	-	3	1	-	1	5
	Santal	-	-	7	2	-	9	18
	Total	-	-	10	3	-	10	23
Chandavilla	Bhuniya	-	-	5	2	-	8	15
	Brahmin	-	-	1	2	-	-	3
	Mahato	-	-	2	1	-	7	10
	Total	-	-	8	5	-	15	28
Hattiasuli	G.Banik	-	-	1	6	-	3	10
	Kumor	-	-	7	26	-	31	64
	Karmakar	-	-	-	-	-	2	2
	Sadgoap	-	-	-	2	-	3	5
	Bhumij	-	-	3	8	-	19	30
	Santal	-	-	-	5	-	8	13
	Total	-	-	11	47	-	66	124
Kukurmuri	Tanti	-	-	1	1	-	2	4
	Santal	-	-	2	11	-	17	30
	Total	-	-	3	12	-	19	34
Total		-	-	32	67	-	110	209

Table 8A. Different types of fuel wood used (past).

Village	Caste/ community	Fuel Wood Used (Present)						
		Sal	Sal Sonjhuri	Eucalyptus	Sal Eucalyptus	Various except Eucalyptu	Various with Eucalyptu	Total
Bagghari	Mahato	–	3	–	–	2	–	5
	Santal	3	8	–	–	7	–	18
	Total	3	11	–	–	9	–	23
Chandavilla	Bhunias	2	6	–	–	7	–	15
	Brahmin	2	1	–	–	–	–	3
	Mahato	2	3	–	–	5	–	10
	Total	6	10	–	–	12	–	28
Hatiasuli	G. Banik	2	3	–	–	5	–	10
	Kumor	2	33	–	–	29	–	64
	Karmakar	–	1	–	–	1	–	2
	Sadgoap	1	4	–	–	–	–	5
	Bhumij	10	13	–	–	7	–	30
	Santal	4	7	–	–	2	–	13
	Total	19	61	–	–	44	–	124
Kukumuri	Tanti	3	1	–	–	–	–	4
	Santal	6	13	–	–	11	–	30
	Total	9	14	–	–	11	–	34
Total		37	96	–	–	76	–	209

Earlier, the rate of eucalyptus use was totally absent amongst the villagers. In Bagghari village, 60% of the Mahato families used Sal-Sonajhuri earlier. About 60% of the Mahato families did so in the past and 40% of them used various types of fuelwood except eucalyptus. Santals used Sal-Sonajhuri mixed and 38.89% used various types of fuel except eucalyptus. In Chandavilla, Bhunias used Sal (13.33%). Earlier 40% of them used Sal-Sonajhuri and

46.67% of them used various types except eucalyptus. Brahmin used Sal as fuel in the past by 66.67% with 33.33% of them using mixed Sal-Sonajhuri. Earlier Mahatos used Sal by 20% and 30% used a mixed of Sal-Sonajhuri and 50% of the Mahato families earlier used various types of wood as fuel except eucalyptus. In Hatiasuli, Gandha baniks used Sal fuel (20%) and 30% used Sal-Sonajhuri as fuel and 50% used various types of fuel except eucalyptus. In the past, 3.13% Kumor used sal as fuel. Earlier 51.56% of them used Sal-Sonajhuri and 45.31% used various types except eucalyptus. Karmakar used Sal Sonajhuri mixed and while others used various types except eucalyptus. Among the Sadgoap, 20% used Sal and 80% used Sal-Sonajhuri in the past; 33% of the Sadgoaps used Sal and 43.33% of them used Sal-Sonajhuri mixed in the past. Also 23.33% of them used various type of fuelwood without eucalyptus. Santal earlier used Sal by 30.77% and 53.85 % used a mix of Sal-Sonajhuri. Only 15.38% depended on various types except eucalyptus. In Kukurmuri village, 75% Tanti families depended on Sal and 25% depended on a mix of Sal-Sonajhuri in the past. Amongst Santals 20% families depended on Sal plantation for fuel and 43.33% depended on a mix of Sal-Sonajhuri and 36.67% resorted to various type of fuel except eucalyptus.

Fuel Eye Problem :

Under afforestation quick growing species like eucalyptus trees were planted. Villagers used them as fuel wood for cooking and food preparation. We also reported that eucalyptus emits more smoke than any other type of fuelwood. We were apprehensive that the smoke of eucalyptus affected users with serious eye problems. Some kind of inflammation seems to have occurred by continuous use of eucalyptus as fuel in closed type of kitchen. In this type of kitchen, air does not pass as quickly as in an open hearth kitchen. People reportedly said that they are now being affected with eye problem more than ever before. Though we cannot explicitly say that the eye problem is due to eucalyptus we are nevertheless sure along with the villagers that eucalyptus burning creates more smoke and is one of the causes which lead to an eye problem. There may be other accompanying factors as well. Table 9 shows quite a good number of persons being affected with eye problem due to eucalyptus. This is a serious impact of eucalyptus plantation. An attempt has been made to give certain estimates of disease affected people.

Table 9. : Disease affected families/persons.

Village	Caste/ community	Total Family	Disease Affected Family	Total Person		Disease Affected Person	
				Male	Female	Male	Female
Bagghari	Mahato	5	1	15	12	—	1
	Santal	18	4	42	44	1	3
	Total	23	5	57	56	1	4
Chandavilla	Bhunias	15	5	33	25	2	6
	Brahmin	3	1	10	9	—	1
	Mahato	10	3	30	27	1	4
	Total	28	9	73	61	3	11
Hatiasuli	G. Banik	10	1	37	24	1	—
	Kumor	64	22	122	126	8	17
	Karmakar	2	—	6	6	—	—
	Sadgoap	5	1	13	10	1	1
	Bhumij	30	9	44	63	2	11
	Santal	13	4	28	26	6	1
	Total	124	37	250	252	18	30
Kukurmuri	Tanti	4	1	9	8	1	—
	Santal	30	11	64	52	7	6
	Total	34	12	73	60	8	6
Grand Total		209	63	453	429	30	51

In Bagghari, a Mahato female has been affected with eye problem and among the Santals 1 male and 3 females are afflicted with such disease. Percentages are 2.38% and 6.81% respectively among the Santals. In Chandavilla among the Bhunias, 2 males and 6 females have been affected with such disease. Among the Brahmin 1 female out of 3 household was a victim of it. Among the Mahatos in Chandavilla, 1 male and 4 females were

affected and their percentage was 3.33% for male and 14.81% for the female. In Hatiasuli, Gandha baniks showed no affected female but a male. Again, 8 males of the Kumor families and 17 females of them were seriously affected by burning of eucalyptus fuel for cooking and pot-making. Karmakar showed no affected person. Sadgoap have 17.69% males affected and 10% females have been affected by that disease. Among the Bhumij, 4.54% males were affected and 17.46% females were affected by such disease. Among the Santals, percentage of male affected is as high as 21.42% while the percentage of female affected is 4.34%. It gives us a clue that males are also sharing kitchen work and hence they were affected by eucalyptus fumes. In Kukurmuri, 1 male among the Tanti was affected by such disease. Among the Santals, 10.93% males were affected and 11.53 % females were also affected by eye problem.

General Observation :

There is no doubt that a much greater attention is paid to develop trees having great commercial values, since the importance of forests as revenue-earner has been increasingly emphasized. It has been noted however, that most of the trees having great commercial value, planted under the various afforestation programmes, are of little use to the forest-dwellers or tribals. In fact, only such variety of trees are planted which are often required for industries, mostly located far off from the forests. Thus, this type of development of forest can not really help the tribals and forest dwellers neither in the context of using forest produces nor in the generation of new employment opportunities locally. The problem has become more acute and critical where new plants are systematically planted replacing the earlier varieties, which were utilized by the tribals including the forest dwellers in a number of ways to meet their various demands. Thus, the new afforestation programmes have not only affected and disturbed the existing tribal economy; it has not even provided an alternative. This type of forest policy in the context of afforestation programmes has already witnessed a number of tribal unrests and conflicts in different parts of India, particularly in the Chhotonagpur region. There are many instances where the tribals, in a group, have uprooted the new commercial trees planted by the Forest Department.

In many areas, it has been noted that the tribals are so intimately connected with the forest that they are quite aware of the utility of various trees, which should be planted under afforestation programmes. Sometimes, this developed due to their close association with forest and keen observation of the forest ecology. But unfortunately, this traditional knowledge is never utilised at the time of afforestation programmes.

To stop rapid deforestation, social forestry programmes have been suggested. Social forestry involves the people at all levels with raising forests as assets for their own use to provide forest goods and services in the rural areas where they are needed the most. The objective is realised by establishing

multipurpose tree plantations that supply fuel and small timber to meet the basic requirements of rural communities, that provide food, fodder, shade and environmental stability and that generate income and employment by providing jobs and raw materials for cottage industries and other minor forest produce. Thus, ideally, the forest can be developed as a support to the rural/tribal economy and to supply raw materials for the forest based industries. It is quite often forgotten that social forestry is not a production forestry. The profit derived from afforestation programmes should not be the motive of social forestry. Instead, the benefit received by the people should be the target of the specific scheme. But in a number of cases this has been ignored. Naturally, it has become a 'senseless social forestry'.

Finally one issue may be discussed about plantation of mono-plants like Eucalyptus under afforestation/plantation programme because of commercial importance. It is likely to affect the bio-diversity reducing the genetical varieties. It has already been mentioned how in areas where there is eucalyptus plantation, not more than 10 varieties of species are found. On one hand, it cannot meet the demands of the people, and on the other it has serious implications so far as the bio-diversity is concerned. Besides, it has been noted that people particularly women are having eye problems of varied degree when eucalyptus is used as fuel in cooking. Degradation of forest may create considerable pressure on women as they are mainly responsible for the collection of fuel. Again, any type of afforestation is not the solution. AS it has been noted, eucalyptus has been planted in the recent past under afforestation programmes, and use of eucalyptus as fuel may have serious health hazards, particularly affecting women.

Apparently there is not much shortage of fuel in the studied villages. This does not reflect the true situation as it is very much related to income and poverty. The hard reality is that the tribals, particularly the poor among them, do not cook much and naturally there is no crisis or shortage of fuel.

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Prediction of Stature from Upper Limb Bone Lengths

SURINDER NATH

Abstract : Researchers from different parts of the world have emphasized that the most precise estimates of stature of unidentified individuals are derived from a sample of the population, sex, age, race, geographical area and the time period to which the unknown is thought to belong. They also emphasized that the regression formulae are not only population specific but are also sex specific and thus should not be used interchangeably.

Keeping these particulars in view an attempt has been made in the present study, to devise regression equations for stature reconstruction using lengths of upper limb bones, i.e. humerus, radius and ulna; belonging to 82 male and 62 female documented skeletons. A total of 864 long bones (492 male and 373 female) were measured for maximum lengths in accordance with standard measurement techniques. Stature was obtained from the documented records of each skeleton.

Analyses divulge highly significant sex differences ($p < 0.001$) for all the measurements and thus data on male and female bones have been processed disjointedly for further analysis. Out of the three long bones of the upper limb, humerus exhibits the highest correlation with stature and least Standard Error of Estimate for either sex suggesting that it could be used for reconstruction of stature with reasonable accuracy as compared to radius and ulna.

Key Words : Stature, Regression formulae, Bone length, Upper limb

INTRODUCTION

Forensic Anthropologists use customary scientific techniques developed in physical anthropology to the identification of skeletal remains shoddily decomposed or otherwise unidentified human remains. During examination of skeletal remains they endeavor to resolve origin, age, sex, number of individuals involved and race besides determination of ante mortem height of the deceased. Out of all these aspects, determination of ante mortem height has attracted attention of most of researchers the world over. As a consequence of this different researchers have worked on various skeletal as well as living population groups and formulated means of stature reconstruction.

Thomas Dwight (1894) recommended two methods for restoration of stature from skeletal remains, i.e. Anatomical and Mathematical. The anatomical method involves in merely arranging the bones together, in reproducing the curves of spine, in making respective allowance for the soft parts and measuring the total length. This method is feasible when a complete skeleton is available for examination. The mathematical method, on the other hand is based on the relationship of individual long bone to the height of an individual and is workable even if a single bone is accessible for evaluation, This method may be used either by computing Multiplication Factors (M.F.) or by formulating regression formulae, using a single bone or a permutation of different long bones.

Due to the apparent drawback of using anatomical method where complete skeleton is required, Fully (1956) implemented certain modifications for its easy workability. He computed percentage contribution of each vertebra to the total height of the column. Thus using values of the missing vertebra and measuring the remaining, the height of the vertebral column is derived by a simple proportionality equation. Besides this Fully integrated following cranial and postcranial measurements for the purpose of stature reconstruction:

Basion- bregma height,
First sacral segment height,
Oblique length of femur,
Tibial length, and
Tarsal height.

After obtaining these measurements and adding the total height of the vertebral column one may obtain skeletal height, which can be used in the following regression equation to obtain living stature or ante mortem height.

Living Stature = $0.98 (\text{total skeletal height}) + 14.63 + 2.05 \text{ cm}$

Fully further suggested addition of a correction factor (CF) to the stature thus obtained:

Estimated stature up to 153.5 cm add 10.0 cm to the result,
Estimated stature between 153.6 and 165.4 cm add 10.5 cm to the result,
Estimated stature above 165.5 cm add 11.5 cm to the result.

The main benefit of Fully's method over the Dwight's is that one need not articulate the complete skeleton as described by Dwight. Secondly, this method is valid universally to males and females of any population around the globe.

Notwithstanding Fully's (1956) attempt to make the anatomical method workable even if a couple of vertebrae are missing as well as highlighting its universal applicability and greater accuracy in the predicted stature, the mathematical method gained more popularity with its obvious advantage that it is more convenient in use as it requires only length of the recovered long bone. The bone length may be entered into respective regression formulae to obtain the estimated height. Somehow this method was in use even before Dwight could name it. Beddoes (1887) made the first attempt to estimate stature from femoral length of 'Older Races of England' for either sex. Subsequently Rollet (1888) published the earliest formal tables for determining stature using all the six long bones of the upper and the lower limbs of 50 male and 50 female French cadavers ranging in age from 24 to 99 years.

Manouvrier (1892) reexamined Rollet's data by excluding 26 males and 25 females above the age of 60 years and based his prediction tables on 24 males and 35 females. He suggested that the length of the trunk declines by about 3 cm of their maximum stature due to the effect of old age. The major difference between the approaches of Rollet and Manouvrier is that the latter determined the average stature of individuals who possessed the same length

of a given long bone while the former determined the average length of a given long bone from individuals with identical stature. Manouvrier further suggested that while determining stature from dried bones, 2 mm to be added to the bone length for cartilage loss and subsequently 2 cm should be added to the corresponding stature to convert the cadaver to the living stature.

Pearson (1899) using Rollet's data developed regression equations for prediction of stature from long bone lengths. He restricted his study to four bones only, i.e. humerus, radius, femur and tibia. His approach to stature estimation was based on regression theory, which involves the calculation of standard deviations for the series of long bones and of coefficients of correlations between the different bone lengths and stature. Pearson's study not only changed the prevailing approach to the stature estimation by providing a more truly "mathematical method" but he departed in other ways, from previous practices.

Stevenson (1929) computed regression formulae for Chinese and compared them with the Pearson's formulae. He observed that there is statistical implausibility, of the order of several millions to one that the formulae of one race would provide a satisfactory prediction of stature of an individual belonging to another group.

Consequently several researchers formulated population and sex specific regression formulae using all the six long bones belonging to the upper and the lower limbs (Mendes-Correa. 1932; Breitingen. 1937; Telkka. 1950; Dupertuis and Hadden. 1951;

Trotter and Gleser, 1952; 1958; Fuji, 1958; Wells, 1959; Genoves, 1967; Kolte and Bansal, 1974; Oliver et al., 1978; Yung-Hao et al., 1979; Cerny and Komenda, 1982; Shitai, 1983; Lundy, 1983; Boldson, 1984; Badkur, 1985; Lundy and Feldesman, 1987; Kodagoda and Jayasinghe, 1988; and Nath, 2000).

The alternative mathematical approach to stature estimation, i.e. the use of multiplication factor, was first advocated by Pan (1924) who formulated MFs for all the six long bones by simply computing the proportion of the said bone to the stature.

Multiplication Factor (MF) = Stature / Bone length

The average MF could be used to estimate stature by simply multiplying the maximum length of the long bone with its MF.

This approach was adopted by various researchers (Nat, 1931; Siddiqui and Shah, 1944; Singh and Sohal, 1952; Kate and Majumdar, 1976; Badkur, 1985; Banerjee et al., 1994) on different Indian skeletal populations. Akin to the regression formulae, these MFs are also population and sex specific and should not be used interchangeably (Nath, 1996). With respect to the use of regression formulae and MFs for estimation of stature, Eliakis et al. (1966) are of the belief that it is indispensable to make regression equations or prediction tables for every race and its sub races. While Medows and Jants (1995) observed that worldly increase in the lower limb bone lengths is

accompanied by relatively longer tibiae and suggested that these secular changes in proportion should be considered while formulating regression formulae for reconstruction of stature.

Out of the two methods of stature restoration, it is observed that the mathematical one is based on the relative proportion of bone lengths to height but it does not take into account the unstable proportions of trunk length to total stature. The anatomical method, by including spine length when measuring skeletal height addresses this source of variation and thus provides greater accuracy in the predicted height. Secondly, the correction factor, which is added to the skeletal height while using anatomical method, compensates for the thickness of the soft tissues at the scalp, soles and cartilages of the joints. There is no proof that these soft tissues differ from one population to another and thus we get a single equation irrespective of sexes for all the population groups.

The anatomical method also provides a possibility to regress individual long bone against skeletal samples lacking living stature or cadaver lengths. These equations only require addition of Fully's correction factor for the soft tissues to obtain estimated stature. One major shortcoming of this method is that it requires virtually complete skeleton for its accomplishment. Thus the first choice of the investigator is to employ the modified anatomical method provided that the skeleton is adequately complete. But in its absence one has to rely on the mathematical method.

In the present study an attempt has been made to formulate sex specific regression equations for estimation of stature using all the three long bones of the upper limb.

MATERIAL AND METHODS

To achieve the aims of the present study all the three long bones of the upper limb, i.e. humerus, radius and ulna, belonging to the right and the left sides of 82 male and 62 female skeletons were measured. This provided a total of 864 bones (492 male and 372 female). Each bone was measured for maximum length in accordance with the standard technique (Martin and Saller, 1959) and the documented stature was recorded for all the 144 skeletons (82 male and 62 female).

Data were subjected to statistical analysis for assessing bilateral and sex differences in the length of all the bones as well as stature. Bone lengths were subsequently correlated with the stature for formulation of sex specific regression equations for estimation of stature from these long bones.

RESULTS

Table-1 presents the mean values and standard deviation for the right and the left side bones of male and female skeletons to observe the bilateral variations, if any. It is evident from the table that all the bones of the right side are longer than the left ones for both the sexes. The apparent variations observed in the

length if these long bones reveal non-significant bilateral for both the sexes. Thus the sides (right and left) have been pooled to assess the sex differences.

Table-2 exhibits the mean values and standard deviation for the pooled (right and left) maximum lengths of humerus, radius and ulna of male and female skeletons. It is clear from the table that the male bones are sufficiently longer than the female ones and the sex differences, as assessed through t-test, are highly significant ($p < 0.001$) for all the bones of the upper extremity as well as for stature.

Values of correlation coefficient between stature and all the three long bones for males along with the respective regression equations for reconstruction of stature are presented in table-3. The formulae for estimation of stature are listed in order of their standard error of estimate (SEE), from the smallest to the largest. It is observed that humerus exhibits the highest correlation with stature followed by ulna and radius.

Table -4 presents the values of correlation coefficient between stature and the three bone lengths of the upper extremity among females along with the linear regression equations for estimation of stature. These equations are listed in the order of their SEE, from smallest to the largest. It is evident that the humerus exhibits the highest correlation with stature followed by radius and ulna.

A careful examination of tables 3 and 4 reveal that the female bones not only show higher correlation with stature than the males but they also exhibit relatively low standard error of estimate indicating that the estimated stature using female bones would be more reliable than the one obtained using male bones. It is also clear that humerus, as it exhibits the least SEE and the highest correlation with stature, would provide the most reliable estimate of stature for both males and females.

DISCUSSION AND CONCLUSIONS

Pearson (1899) remarked that the extension of the regression formulae from one local race to another must be made with great caution. Stevenson (1929), on the other hand, actually demonstrated this by using Pearson's formulae on Chinese data and observed that there exists a statistical improbability of the order of several millions to one that the formulae of one race would yield satisfactory prediction of stature of an individual belonging to another racial group. Subsequently, Lundy (1983) used the regression equations formulated by Trotter and Gleser (1952) on American Negro males to determine the stature of South African Negro males, using the mean long bone lengths of South African Negro males. He observed that in all cases the estimated stature using Trotter and Gleser's formulae is greater than the one obtained using equations derived from South African Negro samples. It was observed that the equations derived from South African Negro data provide less variation in estimated stature from different long bones than do the American formulae.

In the present study a similar attempt has been made to predict stature of Indian male and female skeletal material using regression equations formulated on American White males (Trotter and Gleser, 1958) and females (Trotter and Gleser, 1952), European males and females (Oliver et al., 1978), South African males and females (Lundy and Fieldsman, 1987), Mongoloid males (Trotter and Gleser, 1958) and Chinese males (Xiang-Quing, 1989) for humerus, radius and ulna bones of the upper limb. For estimation of stature the mean bone lengths of humerus, radius and ulna of the present study (Table-2) were used in different prediction formulae and the estimated stature and its difference from the actual stature for males and females is presented in Table-5.

It is evident from Table-5 that the predicted stature for males using humerus is greater than the actual stature on using regression formulae for American Whites, South African and Mongoloids, while for the remaining groups the predicted stature is less than the actual one. The overall variation is observed to be between -2.4 cm among European males and + 8.45 cm among South African males. While among females all the groups exhibit greater estimated stature than the actual one except for South Africans. The overall range being -9.70 cm among South Africans and + 4.44 cm among American Whites.

In contrast to the predicted stature obtained by using humerus, radius exhibits a wide variation, as among males the predicted stature is greater for all the groups except for South Africans. The overall range being - 15.54 cm among South Africans to + 15.52 cm among Afro-Americans. Whereas in case of females the variation is much greater than the one observed in case of humerus but it is relatively less than the one observed among males. It is further noticed that out of the three groups under comparison, two exhibit greater estimated stature than the actual one. The estimated stature fluctuates between - 10.02 cm in case of South African and + 11.31 cm for American Whites.

Estimated stature using ulna also exhibits relatively greater variations than the ones observed on using humerus. Among males all the groups exhibit greater predicted stature except for South Africans and the values vary from -15.03 cm for South Africans to + 8.97 cm among American Whites. In case of females the situation is more or less identical as only South Africans exhibit low estimates of stature. The overall range being from -12.50 cm among South Africans to + 12.52 cm among Europeans.

On using the regression equations formulated in the present study yield the estimated stature in the range of -0.17 cm with humerus to + 0.14 cm with ulna among males while in case of females the range is between -0.09 cm with ulna and -0.16 with humerus. This clearly indicates that the regression formulae are both population and sex specific and thus should not be extended on other population groups belonging to any part of the world.

TABLE 1 : Bilateral Differences in Different Bone Lengths.

Bone	Sex	Right Mean (mm)	S.D.	Left Mean (mm)	S.D.	Value of t
HUM	MALE	313.8	11.3	312.8	16.4	0.401
HUM	FEMALE	301.8	17.9	299.9	17.3	0.601
RAD	MALE	246.5	12.1	244.3	12.6	1.122
RAD	FEMALE	234.2	13.0	232.8	13.5	0.592
ULNA	MALE	265.6	13.2	263.7	13.8	0.889
ULNA	FEMALE	252.4	13.4	251.4	13.4	0.428

TABLE 2 : Sex Differences in Bone Lengths of the Upper Extremity and Stature.

Bone Length/ Stature	Male Mean (mm)	S.D.	Female Mean (mm)	S.D.	Value of t
Humerus	312.7	16.4	299.9	17.3	4.526*
Radius	245.4	12.4	233.5	13.3	7.813*
Ulna	264.7	13.6	251.9	13.4	7.936*
Stature	1661.1	35.5	1542.9	40.2	26.516*

* Significant at 0.01% level ($p < 0.001$)

TABLE 3 : Regression Equations for Estimation of Stature through Upper Extremity Bone Lengths among Males.

Regression Equations	SEE	Value of r
$S = 1209.2 + 1.44$ (Humerus)	27.38	0.655
$S = 1305.2 + 1.45$ (Radius)	30.42	0.501
$S = 1294.6 + 1.39$ (Ulna)	30.91	0.522

TABLE 4 : Regression Equations for Estimation of Stature through Upper Extremity Bone Lengths among Females.

Regression Equations	SEE	Value of r
$S = 1010.5 + 1.77$ (Humerus)	25.58	0.766
$S = 1023 + 2.22$ (Radius)	27.36	0.738
$S = 1003.1 + 2.14$ (Ulna)	28.28	0.715

TABLE 5 : Difference observed in Estimated Stature on using Lengths of HUMERUS, RADIUS and ULNA of the present study (Males-Humeral Length = 31.27 cm; Radial Length = 24.54 cm; Ulnar Length = 26.47' Females-Humeral Length = 29.99 cm, Radial Length = 23.35 cm; Ulnar length = 25.19 cm) in Regression Equations formulated for Different Populations of the World.

Sl. No.	Regression Equations	Actual Stature	Estimated Stature	Difference	Authors/ Year	Population/Sex
1.	2.89 HUM +78.10	166.10	168.47	+2.37	Trotter & Gleser, 1958	American White, Males
2.	3.79RAD+79.42	166.10	172.42	+6.32	-do-	-do-
3.	3.76ULNA+75.55	166.10	175.07	+8.97	-do-	-do-
4.	3.36HUM+57.97	154.29	158.73	+4.44	Trotter& Gleser, 1952	American White, Females
5.	4.74RAD +54.93	154.29	165.60	+11.31	-do-	-do-
6.	4.27ULNA+57.76	154.29	165.23	+11.03	-do-	-do-
7.	3.19HUM+64.19	166.10	163.96	-2.14	Oliver et al. 1978	European Males
8.	3.96ULNA+66.71	166.10	171.48	+5.38	-do-	-do-
9.	3.09HUM +62.31	154.29	154.92	+0.63	Oliver et al. 1987	European Females
10.	4.09ULNA+63.71	154.29	166.81	+12.53	-do-	-do-
11.	2.88HUM+75.48	166.10	165.53	-0.57	Trotter & Gleser, 1958	Afro-American Males
12.	3.92RAD +85.43	166.10	181.62	+15.52	-do-	-do-
13.	3.20ULNA+82.77	166.10	167.47	+1.37	-do-	-do-
14.	3.08HUM +64.67	154.29	157.03	+2.74	Trotter & Gleser, 1952	Afro-American Females
15.	3.67RAD +71.79	154.29	157.48	+2.19	-do-	-do-
16.	3.20ULNA+75.38	154.29	158.75	+4.46	-do-	-do-
17.	2.89HUM+60.21	166.10	174.55	+8.45	Lundy & Feldesman, 1987	South African Males
18.	3.19RAD +72.14	166.10	150.56	-15.54	-do-	-do-
19.	2.96ULNA+72.70	166.10	151.07	-15.03	-do-	-do-

Sl. No.	Regression Equations	Actual Stature	Estimated Stature	Difference	Authors/ Year	Population/Sex
20.	3.29HUM+45.89	154.29	144.59	-9.70	Lundy & Feldestman, 1987	South African Females
21.	4.16RAD +47.12	154.29	144.27	-10.02	-do-	-do-
22.	3.82ULNA+47.57	154.29	141.79	-12.50	-do-	-do-
23.	2.68HUM +83.19	166.10	166.99	+0.89	Trotter & Gleser, 1958	Mongoloid Males
24.	3.54RAD +82.00	166.10	168.87	+2.77	-do-	-do-
25.	3.48ULNA+77.45	166.10	169.56	+3.46	-do-	-do-
26.	2.66HUM+82.64	166.10	165.81	-0.29	Xiang-Qing, 1989	Chinese Males
27.	3.49RAD+82.71	166.10	168.35	+2.25	-do-	-do-
28.	2.86ULNA+92.82	166.10	168.52	+2.42	-do-	-do-
29.	1.44HUM+210.91	166.10	165.93	-0.17	Present Study	Indian Males
30.	1.45RAD+ 130.51	166.10	166.09	-0.01	-do-	-do-
31.	1.39ULNA+129.45	166.10	166.24	+0.14	-do-	-do-
32.	1.77HUM+101.05	154.29	154.13	-0.16	-do-	Indian Females
33.	2.22RAD+102.33	154.29	154.16	-0.13	-do-	-do-
34.	2.14ULNA+100.30	154.29	154.20	-0.09	-do-	-do-

HUM =Humerus; RAD = Radius;

Range of Variation in Estimated Stature on using Different Regression Equations

MALES:-

Humerus: -2.14 cm to + 8.45 cm,

Radius: -15.54 cm to + 15.52 cm,

Ulna: -15.03 cm to + 8.97 cm,

FEMALES:-

Humerus: -9.70 cm to + 4.44 cm,

Radius: -10.02 cm to + 11.31 cm,

Ulna: -12.50 cm to + 12.52 cm.

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Use of Anthropometric Technique in Biomedical Research in the New Millennium

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Anthropometry, the science of measuring different parts of the human body, takes into consideration of quantifying variations in body size, shape and composition. It specially belongs to the field of Physical/Biological Anthropology. It is one of the most fundamental practical techniques of human biology, since nearly all-biological functions are in some way related to one or other aspect of the physical dimensions of the human body.

The application of anthropology is no more limited to classical studies on variation, growth and nutrition of man (Crew, 1997). The technique of anthropometry has widely and most successfully applied to the assessment of overall health and welfare of individuals as well as populations. Current literature shows that transdisciplinary approach of anthropometry has its wide application to research related to the elderly, sports medicine, obese individuals, metabolic complication and chronic disease including coronary heart disease (CHD). The use of anthropometry as proxies or indicators of a state, condition, or risk is a well established and time honoured concept in the domain of biomedical research.

Even with the availability of so much modern techniques like magnetic resonance imaging (MRI), computerized axial tomography (CAT) bioelectrical impedance analysis (BIA), dual energy x-ray absorptiometry (DEXA), anthropometry still is the most universally applicable, inexpensive and noninvasive method available to access the size, proportion and composition of the human body (WHO, 1995; Goran, 1999; Heymsfield et al. 2000; Wildman and Medeiros, 2000). In recent years, anthropometric indicators such as waist circumference (WC), waist-hip ratio (WHR), conicity index (CI) etc. are repeatedly shown to be simple yet powerful predictors of common adult chronic conditions such as coronary heart, disease (CHD), non insulin dependent diabetes mellitus (NIDDM), hypertension (HT), etc. (Donahue et al., 1987; Shimokata et al., 1989; Despres et al., 1990; Despres, 1991; McKeigue et al., 1991; Johnson et al., 1992; Valdez et al., 1993; Lemieux et al., 1996; Bose and Mascie-Taylor, 1998; Mueller et al., 1996, Ghosh et al., 2000; Kopelman, 2000). Studies in general have shown that individuals with high proportion of abdominal fat as measured by WC, WHR and CI etc. display significant changes in their plasma lipid and lipoprotein concentration.

South Asians (including people of Indian origin) have a more

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centralized distribution of body fat, with thick trunk skinfolds and markedly higher mean WHR for a given level of BMI compared to Europeans (McKeigue et al., 1991; Shergiker et al., 1991; Ramachandran et al., 1992) and have recorded highest rates of coronary heart disease (CHD) worldwide (Enas, 2000; Ramachandran et al., 2001). Indians those settled in the US having a 4 fold higher prevalence than white Americans and 6 fold higher hospitalization than Chinese Americans (Enas, 2000) and CHD has been predicted to rank first among the causes of death in Indian population by 2015 (Reddy et al. 2002; Yajnik, 2002). McKeigue et al., (1991) in their pioneering work have mentioned that the insulin resistance syndrome is associated with a striking tendency to central obesity in South Asians (e.g. Indians) men, although they are no more overweight than European men. That is to say south Asians (e.g. Indians) have a more centralized distribution of body fat, with thick trunk skinfolds and markedly higher central obesity for a given level of BMI.

Recently finding in this extent from the Department of Anthropology, University of Calcutta has been accepted in the Journal of the Royal Society of Health in UK. Results of ANOVA using central obesity status (Centrally non obese or CNO=no; Centrally obese or CO=yes) and BMI (BMI tertiles) as categorical variables has demonstrated significant effect of central obesity and not of BMI on TC, VLDL, FPG and FTG (Table 1).

However, it is noteworthy to mention here that significant positive relationship between central obesity measures and metabolic risk factors of CHD has limited epidemiological and clinical application unless a specific cut-off point of central obesity measures particularly WC and WHR allows direct inter-individual as well as inter population comparison. Utilizing the **Fifth report of Joint National Committee (JNC-V)** cut – off point of WHR ($\text{WHR} \geq 0.95$) and WHO (2000) recommendation of WC ($\text{WC} \geq 90$ cm) for south Asians (e.g. Indians), central obesity was defined among Bengalee Hindu Population (Table 2). It revealed that centrally obese men had significantly greater means compared to centrally non-obese subjects for metabolic risk factors and blood pressure.

Finally, the association of central obesity with metabolic risk factors is not the same in all ethnic groups. Since there existed vast ethnic heterogeneity in India, it would be interesting to study other populations to determine whether the trend observed in our study also exists among these groups. There is paucity of data on the association of central adiposity and metabolic risk factors of CHD among various ethnic groups in India. More importantly, studies should be undertaken to obtain the optimum cut off points (using Receiver Operating Characteristic [ROC] curve) to define central obesity among various Indian population. In this aspect organizations such as ICMR, AnSI and Biological Anthropologists of Indian Universities should have to work together to fulfill this aim.

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Table 1 : ANOVA of Central Obesity Status (CNO=no, CO=yes) and BMI tertiles with metabolic variables.

Dependent Variable	F	M
TC		
<u>Main Effects</u>		
BMI Tertile	2.072	0.130
Central Obesity Status	4.270	0.993
BMI tertile- Central Obesity status Interaction	0.007	0.993
VLDL		
<u>Main Effects</u>		
BMI Tertile	0.180	0.836
Central Obesity Status	5.488	0.021
BMI tertile- Central Obesity status Interaction	0.180	0.836
FPG		
<u>Main Effects</u>		
BMI Tertile	0.193	0.825
Central Obesity Status	5.826	0.017
BMI tertile- Central Obesity status Interaction	0.275	0.760

Main Effects

BMI Tertile	0.180	0.836
Central Obesity Status	5.488	0.021
BMI tertile- Central Obesity status	0.186	0.831
Interaction		

Table 2. Comparison of metabolic and blood pressure variables and indices among two subgroups based on waist-hip ratio (WHR) in the present study population.

Variables	Waist-hip ratio	Waist-hip ratio
	(≥ 0.95) (n = 153)	(< 0.95) (n = 59)
• Total Cholesterol*	5.58	5.29
• Fasting Triglyceride**	2.42	1.94
• Fasting Plasma Glucose**	6.39	6.95
• Very Low Density Lipoprotein Cholesterol**	1.11	0.889
• Total Cholesterol (TC)/ High Density Lipoprotein Cholesterol (HDL-c)*	4.52	4.26
• Very low Density Lipoprotein Cholesterol (VLDL-c)/ High Density Lipoprotein Cholesterol (HDL-c)**	0.907	0.721
• Atherogenic Index*	3.52	3.26
Diastolic Blood Pressure*	82.88	79.42
Mean Arterial Blood Pressure*	99.85	96.05

Metabolic variables (mmol/L)

Blood pressure (mm Hg)

• = Log (10) transformed values were used

Significant at *p<0.05; **p<0.01

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A Study on Reproductive Performances of Santal Females of Eastern India

ARUP RATAN BANDYOPADHYAY

Introduction

One of the basic characters of life is reproduction. This is the inherent property of the living organisms to continue their race by the mechanism of reproduction. The reproduction is a process by which the living beings propagate their own kinds.

The capacity for maintenance of continuity on homeostasis is the central theme of life. The continuity is maintained through urge for reproduction, the formation of new individuals, its growth and sustenance (Young 1971).

Pearl (1934) accounted the urge for reproduction as a basic attribute of all living organisms and identified it in reality as an extension of the urge of survival. The expressive form of the urge for reproduction thus could be accounted as reproductivity or fertility. It could be measured quantitatively by birth rate. He emphasized that the term 'fertility' – 'be used to designate the actual reproductive capacity of pairs of organism, male and female, as expressed by their ability when mated together to produce individual offspring'. While the fecundity was designated 'as innate potential reproductive capacity of the individual or organism, as denoted by its ability to form and separate from the body as mature germ cells'.

Lorimer (1954) observed that the reproduction or the fertility was net effect of procreative tendency and that the tendency was to survive from birth to procreative stages. He differentiated fecundity from fertility as the capacity to produce living offspring. Montagu (1957) noted that the fecundity is the physiological capacity to participate in reproduction, while the fertility as the expressive form of fecundity in terms of performance and therefore measurable. Berclay (1958) defined fertility as an actual level of performance in a population, which could be measured by the occurrence of number of live births. He also differentiated fertility from fecundity; the later one according to him was the potential level of performance.

Pearl (1939) noted that the urge for reproduction could not be expressed in human in its full strength due to several restrictive forces, out of which, the legal and the hedonistic ones were accounted as of particular importance. Beside the above ones, Pearl (1939) differentiated eight biological variables, such as

- Sexual desire (libido)
- Innate reproductive capacity with advancing age
- The span of reproductive life. (menarche to menopause)

- Litter size
- Frequency of coitus
- Frequency of occurrence of pregnancy (pregnancy rates)
- Prevalence of contraceptive efforts and
- Reproductive wastage as determining factors for causing variation in reproductive or fertility in man.

Inter-relationships between one with the other and the influence of the indirect variables like economic circumstances, density of population, religion and nation were also emphasized.

It will be apparent from the above that, although, Pearl (1939) has not covered some of the factors like menstrual cycle length, post widowhood celibacy, voluntary abstinence and similar other factors affecting fertility. In spite of that his pioneer contribution is accredited as hallmark providing the basic framework for the understanding of reproductive biology of man.

Human fertility from the demographic point of view with socio-biological connotation has been subject matter of large number of studies. Contribution of Curjel (1920); Roberts (1927); Ford (1945); Lorimer (1954); Coale and Hoover (1958); Coale and Tye (1961) and others are notable and significant in this field.

Influence of socio-cultural factors (Madhavan 1965, Banerjee and Banerjee 1988, Danker-Hopfe 1986, Bodser and Sussane 1998, Marroden et al., 2000, Salces et al. 2001) in terms of degree of urbanization (Tojo et al., 1982) geographical location (Bhalla et al., 1983), income (Moberg 1951; Stys 1957; Duncan 1965), socio-economic status (Beilicki et al., 1986); family size and birth order (Singh 1972) nutrition (Simodon et al., 1997) education (Bhuiya and Streatfield 1991); residence (Goldberg 1959); employment of women (Sweet 1976); religion and ethnicity (Ahmed 1981; Finnas 1991) have also been taken into consideration in fertility differences.

The hedonistic attitude of human for the reduction of fertility has been well accounted phenomenon in all advanced societies due to a number of factors like the diffusion of differential knowledge and practice of birth control and its implementation. On the one hand, delayed marriage, growth of education, high income level, the increase in number of unwanted births-concerning induced abortion, natural foetal wastage, lactational amenorrhea, the frequency of longer infecundability or sterility, prolonged breast feeding, celibacy, sexual abstinence, widowhood or separation, spacing of children, decline of infant mortality were also taken into consideration. Contributions of Ford (1952); Becker (1960); Bicego et al (1991); Guz and Hobcraft (1991) and others are significant In this respect.

Fertility surveys in India date back to census operation of 1911. In the subsequent periods, contributions of Mandelbaum (1972); Dasgupta (1982); Driver (1963); Agarwala (1966); Mukherjee and Devi (1982) are notable in this regard.

In addition to above, works of Sen (1975); Ray (1954); Rakshit (1962); Pakrasi (1975); Chakravarty (1970); Sidhu (1986); and others have provided firm background for the understanding of the fertility behaviour of the Indian couples.

It will be apparent from the above that the fertility of Indian couples in their different socio-economic strata as well as in different geographical background has been subjected to meticulous investigation. In addition to the above, contributions of Roberts (1954); Mukherjee (1961); Rele (1963); Talwar (1967); Sharma (1978); Banerjee (1980); Basu et al (1980); Barua (1987); Banerjee and Banerjee (1988); Sharma (1978); Das and Das (1992) have provided the deep insight to the understanding of the several problems related to differential fertility in India.

Pakrasi, Banerjee and Das (1976) and Pakrasi, Banerjee and Halder (1980) have already provided a general compendium on differential fertility in India from the socio-biological point of view.

It would be apparent from the foregoing discussion, that the main emphasis on the fertility study or sunken India was laid to find out differential fertility in terms of socio-economic status, geographical location, major cultural and demographic variables associated with high or low reproduction and the effect of deliberate limitation of reproduction. Influence of biological factors, as determinants of expressed difference in fertility especially in the contemporary urban set up of Bengal, are yet to receive much attention. Attempts of Sarkar (1967); Pakrasi (1975) for Bengal Bandyopadhyay (1994) for Bengal and Omran et al (1976) for South Indians are no doubt notables in this context.

Apart from the studies regarding the differential fertility in urban societies, there is a general paucity of knowledge in studies on rural and specially on the tribal population of West Bengal and other parts of Eastern India. Moreover, district wise studies in West Bengal revealed much emphasis in urban population of Calcutta. On the other hand, a few population studies in other districts had been carried out (Tamangs of Jalpaiguri : Piplai 1983; Muslims of Burdwan : Bhattacharya 1986; School girls of hilly area of Darjeeling : Chakraborty and Sinha 1991; Bagdi of Midnapore : Talukder 1977). However, the tribal populations from West Bengal that had been studied were Lodhas of Midnapore (Roy 1981), Santals of Birbhum (Bandyopadhyay 2001), Mundas of Midnapore (Bandyopadhyay et al., 2002).

Anthropometry is the means of quantifying variation in body size and shape (Weiner and Lourie, 1981). It is one of the most fundamental practical techniques of human biology, since nearly all-biological functions are in some way related to one or other aspect of the physical dimension of the body. Numerous methods are available to assess body composition, all with their own advantages and limitations (Lukaski, 1987). Along with the traditional methods, modern techniques with complex instrumentation, CAT, DEXA or

MRI is not suitable for field investigation due to time and economic constraints (Lukaski, 1987, Wildman and Medeiros, 2000). Now there is deluge of application of anthropometric indicators in the field of body composition pertaining to body mass index, regional adiposity, body fat distribution etc. It has been assumed that characteristic level of general body fat distribution, as measured by body mass index (BMI) (Deurenberg et al. 1991) and central body fat (CBF) unfolds during the normal course of growth and *development*.

In human female, the biological event like onset of menarche is universally taken as one of the criteria of sexual maturity and development. Menarche although signifies the maturity status involving sexual development, but it does not usually signify the attainment of the capacity for full reproductive functions (Tanner 1978). In the last two or more decades, the age at menarche was the single most popular topic in the study of auxology. However, skeletal maturity or bone age was itself also very much subject matter in global perspective. Some of these works were concerned with establishing and refining the relatively new Tanner-Whitehouse system for bone age, but most are using bone as a mirror of conditions, just as with menarche (Tanner 1999).

Decline of the menarcheal age in developed countries has been observed in developing countries through decades (Sarkar and Roy 1968, Tanner 1973, Wyshak and Frisch 1982, Eveleth 1986, Ostersehl and Danker-Hopfe 1991, Olsen et al. 2000, Hesketh et al. 2002). Age at menarche as one of the strong factors for the fertility survey in India has been identified by many of the authors (*Driver* 1963, *Agarwala* 1966, Freed and Freed 1971). Although a few works have been undertaken in rural West Bengal, India including tribal population (Talukder 1977, Ray 1981), variation in age at menarche was noted. The association of relatively high age at menarche and malnutrition caused by war and post-war related factors like inflation, flood and famine has been observed in Asia (Chowdhury et al. 2000, Hesketh et al. 2002), European population (Tahirovic 1998, Zivka and Brali 2000, Bini et al. 2000), African population (Simmondon et al. 1997, Henneberg and Louw 1995) and other countries.

Among the Indian population, studies have been conducted on the age at menarche of adolescent girls of India (Satyanaryana and Naidu 1979, Rao et al. 1998). There are very few studies related to body composition on pre-menarcheal and post-menarcheal subjects (Bhadra et al. 2001), growth (Chatterjee and Mandal 1991) and nutritional status (Bharati and Bharati 1998). To best of our knowledge, the present study is the first from a tribal group of India to compare the relationship of general distribution of body fat and menarcheal age. In view of the above consideration the present work has been undertaken among 332 Santal girls of Bolpur area of Birbhum, West Bengal, India and from the four adjacent villages-Deoli, Galudih, Karasai, and Nischintpur; Galudih-District of East Singhbhum, Jharkhand to study the

reproductive performance of the Santal females living in Eastern India and also to determine the current age at menarche and to identify its association with body mass index.

Objectives

To study on biological factors like age at menarche, marriage-conception interval, pregnancy outcome, reproductive wastage, and child mortality on their reproductive performances.

To study the influences of different socio-cultural variables like age at marriage, educational attainment and socio-economic status on their reproductive life.

To identify the association of menarche with Body Mass Index.

Materials and Methods

Material for the present study is comprised from the 332 Santal girls of Bolpur area of Birbhum, West Bengal, India and from the four adjacent villages-Deoli, Galudih, Karasai, and Nischintpur; Galudih, District of East Singhbhum, Jharkhand.

The present study is the out come of application of a specially prepared pre-tested schedule for collecting the detailed reproductive history of the females along with her husband and widow unmarried females except those who have not started menstrual period and a general census schedule. Age, place of birth, -place of original home, place of residence, family type, age at marriage, economic status, education and other relevant information regarding this study has been noted. Age determination has been obtained according to National Health and demographic survey in terms of school register, horoscope and also on the basis of festive and event calendar. Moreover, diet intake survey was conducted by 24 hours recall method. Data on menarcheal status were based on cross-sectional reporting whether the girls had started menstruation or not at the time of interview and also retrospective information about the first occasion of menstruation for those who had reached menarche. The age at menarche was calculated using status quo (Probit analysis) method (Finney 1971). Information regarding menarcheal status was collected from the subject herself and also cross-checked from female near relatives.

All anthropometric measurements were done by using standard anthropometric techniques (Cameron 1984, Weiner and Lourie, 1981). Height and weight was measured to the nearest of 0.1 cm and 0.2 kg respectively ,while for stature and all the circumference measurements has been taken nearest to 0.1 Cm. For assessment of general body fatness BMI (Body Mass Index) was derived (Gonzales and Villena, 1996) using the standard equation (Side, Mingtang, Shuquam et al. 1991) and individuals were categorised according to standard BMI categories (James et al. 1980, Ferro-Luzzi, Sette,

Franklin et al. 1992). The doctor and consultant from Public Health Service of local area clinically examined subjects for the presence of angular stomatitis.

For analyzing the data different statistics are being taken into consideration. In addition to the descriptive statistics, different tests for significance were utilized in appropriate places (Madrigal, 1998). For analysis of data, Microsoft Excel (Windows version 6.0) software systems were also utilized. Besides this, for population data analysis different rates, ratio and proportions has been done (Rao 1996).

Results and Discussion :

Distribution of Santal females according to their age group has been presented in Table -1. It will be apparent from the table that highest population frequency was revealed in the age group of 14-18 years followed by 9-13 years age group. However, age at menarche for the study population was found to be 13.34 years. Table-3 represents a trend towards higher mean parity in the higher age group 55-64 years, while the lower age groups having lesser mean parity.

Analysis of pregnancy outcome revealed (Table-4) a trend of less pregnancy towards the smaller age group and the occurrence of live birth also showed almost same result. Analysis of fertility rates, however, (Table-5) showed an increasing trend in lesser age groups with the highest age specific fertility rate in 14-18 yrs.

With regard to the association with different biosocial factors with age at menarche revealed interesting picture when analyzed with literacy and socio-economic groups (Table 6 & 7). Illiterate Santal females had higher ($P<0.05$) mean age compared to that of the literate. Socio-economic levels revealed lower age at menarche in higher socio-economic class.

Mean age at marriage was found to be highest in, 16 years (Table-8). Examination of mean age at marriage and literacy status revealed (Table-9) higher mean age at marriage in literate group, while higher economic (Table-10) status also revealed higher mean age at marriage.

Studies regarding contraceptive efforts for family planning Santal women were found to be having a trend of using contraceptives in the lower age group (14-28 years), compared to that of the higher age groups over 28 years (Table 11 & 12). Examination on marriage conception interval on Santal women (Table-13) who have never used contraceptive revealed higher intervals ($P<0.05$) in higher age groups when compared with the lower age groups. Distribution of pregnancy outcome and fetal wastage of Santal females according to their present age as presented in table 14 were found to be noteworthy. Total number of pregnancy was found to be significantly ($P<0.01$) lesser in 15-44 years age group compared to that of 45+ age group. Moreover, fetal wastage is also found to be higher in 55-64 years age group.

The result of fetal wastage when analyzed as reproductive wastage [fetal

death] among the mothers according to their present age (Table-15) revealed a significantly higher ($P<0.01$) fetal deaths per 1000 mothers (1125.0) and fetal deaths per 10000 pregnancies (281.2) in higher age groups (55-64 years).

The present study was attempted to find out the biological factors like age at menarche, marriage-conception interval, pregnancy outcome, reproductive wastage, and child mortality on their reproductive performances and the influences of different socio-cultural variables like age at marriage, educational attainment and socio-economic status on their reproductive life. On the basis of the aforesaid connotation table 16 and 17 presents the biological and socio-biological events among the mothers according to their educational attainments and socio-economic status. Literacy status revealed, however, a significant association (Table-16) between literacy and lower mean menarcheal age. Contrary to that mean, age at marriage was found to be higher in literate (16.10 SD 0.43) Santal girls than the illiterates. Furthermore, marriage conception intervals and mean number of live births were also higher in literate Santal females when compared with the illiterates. Examination of child mortality in terms of fetal and child death, illiterate Santal females revealed slightly higher incidences than their literate counterparts.

Age at menarche and socio-economic status one of the major factor for undernutrition revealed a generalized association between lower socioeconomic status and higher menarcheal age in Indian (Sen 1953, Madhavan 1965, Roberts et al. 1977, Banerjee and Oas 1978, Banerjee and Banerjee 1988) and world perspective as well (Burrell, Heally and Tanner 1961, Oanker-Hopfe 1986, Prado and Martin-Freire, 1988, Lindgern and Cernerud, 1992, Martuzzi and Gueresi 1994, Onat and Ertem 1995, Marrodan, Mesa et al. 2000, Chowdhury et al. 2000, Hesketh et al. 2002, Tahirovic 1998, Zivka and Brali 2000, Bini et al. 2000, Simmondon et al. 1997, Henneberg and Louw 1995). Contrary to that, due to socioeconomic biases regarding the data on menarcheal ages produce somewhat altered results (Hediger and Stein, 1987, Stark et al. 1989, Henneberg and Louw, 1998, Artaria and Henneberg 2000). Examination on socio-economic status and age at menarche, marriage, child mortality etc. revealed (Table-17) significantly higher ($P<0.05$) mean menarcheal age (14.24 SD 1.68) in lower socio-economic groups compared to that of higher and middle socio-economic groups. However, mean age at marriage had the increasing trend with socio-economic groups. Marriage conception intervals showed almost similar frequency in higher (39.45 months) and middle (40.07 months) socio-economic groups. On the other hand lower socio-economic group was found to have significantly ($P<0.05$) lesser marriage conception intervals (26.76 months) than the other two groups. Mean number of live births of the three socio-economic groups were found to be almost similar, while the child mortality (mean) in terms of fetal and neonatal death were lower in higher socio-economic groups than lower and middle socio-economic groups.

General view of the study population is presented in table-2. A total of 332 Santal girls from different villages of Bolpur West Bengal and villages of East Singhbhum, Jharkhand were collected, of which complete data on anthropometry and menarcheal status were obtained from 114 adolescent girls (Table-18). It will be apparent from table-18, that the mean age at menarche may be determined as 13.2 SD 1.28 years with a range of 10-16 years and modal age at menarche was found to be 13 years.

Comparison of general distribution of fat according to menarcheal status has been presented in table-19. The mean weight and BMI has been found to be significantly higher ($P < 0.05$) in menstruating girls for 11, 13, 14 and 15 years of age group. Examination on height revealed significantly higher in menstruating girls for 11-14 years of age group compared to that of the non-menstruating girls. The mean BMI was also greater in menstruating girls ($P > 0.20$) compared to non-menstruating girls.

In this study the mean age at menarche in the Santal girls of West Bengal and Jharkhand has been found to be 13.2 years. The present findings of mean menarcheal age of Santal girls were found to corroborative with samples from Munda tribal group of West Bengal (Bandyopadhyay et al 2002). However, the age at menarche of Lodha tribal group from Midnapore district, was found to be 12.8 years (Ray 1981), Bengalee population as 13.4 years (Chakraborty and Sinha, 1991) and Bagdi population as 13.6 years (Sarkar and Roy 1968), West Bengal. Examination on the result of the mean age at menarche of Santal girls revealed a close range with other published data from South India (Madhavan 1965, Satyanarayana and Naidu 1979, Rao et al 1998), Calcutta urban, West Bengal, India (Bandyopadhyay 1994) Bharati and: Bharati 1998) and as well as data from rural and urban Hindu Bengalee population of West Bengal (Banerjee and Mukherjee 1961).

World wide data regarding the ethnic groups also showed similar feature (Ulijasek et al. 1991, Rees 1993, Cameroon and Nagdee 1996), while the population or very low socio-economic status rural Senegalese for example, the age at menarche was found to be 16.1 years (Simondon et al. 1997).

Age at menarche and socio-economic status, one of the major factor for undernutrition revealed a generalized association between lower socioeconomic status and higher menarcheal age in Indian (Sen 1953, Madhavan 1965, Roberts et al. 1977, Banerjee and Das 1978, Banerjee and Banerjee 1988) and world perspective as well (Burrell, Heally and Tanner 1961, Danker-Hopfe 1986, Prado and Martin-Freire, 1988, Lindgern and Cerperud, 1992, Martuzzi and Guerresi 1994, Onat and Ertem 1995, Marrodan, Mesa et al. 2000, Chowdhury et al. 2000, Hesketh et al. 2002, Tahirovic 1998, Zivka and Brali 2000, Bini et al. 2000, Simmondon et al. 1997, Henneberg and Louw 1995). Contrary to that, due to socio-economic biases regarding the data on menarcheal ages produce somewhat altered results (Hediger and Stein, 1987, Stark et al. 1989, Henneberg and Louw, 1998, Artaria and Henneberg 2000).

Observation of the study on English girls (Stark et al. 1989) revealed that in well nourished population the age at menarche is mostly regulated by genetic factors and nutrition is less important. The present study based on undernourished population with appreciable prevalence of thinness (69.1%), showed that the girls who attained menarche were significantly taller, heavier and consequently with a higher BMI compared to those of similar age groups who had not attained menarche. The result of this study is corroborative with the work by Chowdhury et al. (1977) and Chowdhury et al. (2000) on rural Bangladeshi girls and also urban Bengalee girls from Howrah District, West Bengal, India (Bharati and Bharati, 1998).

Results of the present study will be important for possible impact of health and nutritional interventions on the age at menarche. Further studies are required to investigate and in promoting development programs for mother child health care and to improve nutritional status of the adolescent girls in rural area specially of tribal population in India.

Table 1 : Number of Santal Females on the Basis of Different Age Groups.

Age Group	Number Of Females	Percentage
9-13	71	21.38
14-18	79	23.79
19-23	37	11.14
24-28	30	9.03
29-33	25	7.53
34-38	17	5.12
39-43	12	3.61
44-48	16	4.81
49-53	14	4.21
54-58	10	3.01
59-63	7	2.10
64-68	2	0.602
69-73	10	3.01
74-78	0	0.00
79-83	2	0.602.

Table 2 : Age at Menarche (N=332) [Probit analysis]

Age at Menarchy	Frequency	Percentage	Cumulative Frequency
10	3	0.90	0.90
11	13	3.91	4.81
12	61	18.37	23.18
13	128	38.55	61.73
14	70	21.08	82.81
15	38	11.44	94.25
16	14	4.21	98.46
17	4	1.20	99.67
18	1	0.30	100.00
TOTAL	332	100.00	

Mean : 13.34, SD : 0.54, Range : 10-18, Mode : 13.00

Table 3 : Distribution of Pregnancies Among the Mothers According to Their Present Age.

Present age (yrs)	Number of months	Number of Pregnancy										Total number of pregnancy	Mean Parity
		1	2	3	4	5	6	7	8	9	10		
15-24	29	15	11	1	2	0	0	0	0	0	0	48	1.65
%	18.95	68.18	40.74	3.84	7.40	0	0	0	0	0	0	8.39	
25-34	39	3	9	12	1	4	1	1	0	0	0	132	3.38
%	25.49	13.63	33.33	34.61	44.44	26.66	11.11	0	0	0	0	23.07	
35-44	28	1	1	7	5	9	2	1	2	0	0	124	4.42
%	18.30	4.54	3.70	26.92	18.51	42.85	13.33	11.11	66.67	0	0	21.67	
45-54	29	1	4	6	5	5	5	3	0	0	0	123	4.24
%	18.95	4.54	14.81	23.07	18.51	23.80	33.33	33.33	0	0	0	21.50	
55-64	14	0	1	0	2	5	1	2	1	2	0	81	5.78
%	9.15	0	3.70	0	7.40	23.80	6.66	22.22	33.33	100.0	0	14.16	
65-74	12	1	0	3	1	1	3	2	0	0	1	61	5.08
%	7.84	4.54	0	11.53	3.70	4.76	20.00	22.22	0	0	100	10.66	
75-84	2	1	1	0	0	0	0	0	0	0	0	3	1.50
%	1.30	4.54	3.70	0	0	0	0	0	0	0	0	0.52	
TOTAL	153	22	27	26	27	21	15	9	3	2	1		

Table 4 : Distribution of Pregnancy and Pregnancy out come of Mothers According to Their Present Age.

Present Age	N	Number of Pregnancies	Caring Child	Pregnancy Out Come				Total Number Fetal Wastage
				Live Birth	Still Birth	Artificial/ other Abortion	Spontaneous abortion	
15-24	29	48	0	46	1	1	0	2
%	18.95	8.39	0	8.30	16.67	11.11	0	13.33
25-34	39	132	3	124	1	4	0	5
%	25.49	23.07	0	22.38	16.67	44.44	0	33.33
35-44	28	124	0	123	1	0	0	1
%	18.30	21.67	0	22.20	16.67	0	0	66.67
45-54	29	123	0	120	2	1	0	3
%	18.95	21.50	0	21.66	33.33	11.11	0	20.00
55-64	14	81	0	77	1	3	0	4
%	9.15	14.16	0	13.89	16.67	33.33	0	26.67
65-74	12	61	0	61	0	0	0	0
%	7.84	10.66	0	11.01	0	0	0	0
75-84	2	3	0	3	0	0	0	0
%	1.30	0.52	0	0.54	0	0	0	0
TOTAL	153	572	3	554	6	9	0	15

Table 5 : Fertility Rates of Santal Females

Age of the Mothers (yr.)	Number of Mothers (p_1)	Total number of live births (b_1)	Age specific fertility rates
15-24	29	23	7.93
25-34	39	19	4.87
35-44	28	1	0.35
45-54	29	0	0
55-64	14	0	0
65-74	12	0	0
75-84	2	0	0
TOTAL	Total Mother = 153	43	13.15

Table 6 : Distribution of Mean age at Menarche According to the Educational Status of the Santal Females.

Number of Females	Illiterate	Literate
332	92	143
Mean	13.93	13.57
S.D.	1.53	0.51
S.E.	0.32	0.07

Table 7 : Distribution of Mean age at Menarche (Yrs) According to the Economic Status of the Santal Females.

Number of Females	Income Level		
	Less Than Rs. 1499 [Lower]	Rs. 1500-2999 [Middle]	Rs. 3000 + [Higher]
332	89	123	120
Mean	14.24	13.72	13.55
S.D.	1.68	1.43	1.44
S.E.	0.24	0.19	0.21

Table 8 : Distribution of the Married Female According to their age at First Marriage and Mean Menarcheal Age.

Age at First Marriage	Number of Individual	Mean Menarcheal Age
10	2	13.00
11	2	12.00
12	8	12.75
13	18	13.55
14	32	13.06
15	40	14.15
16	58	14.17
17	26	14.15
18	28	14.57
19	32	14.68
20	8	15.25
22	2	16.00
TOTAL	256	

Table 9 : Distribution of age at First Marriage According to their Educational Status.

Number of Females	Illiterate	Literate
256	166	90
Mean	15.86	16.10
S.D.	2.25	0.43

Table 10 : Distribution of age at First Marriage of the Santal Females According to their Economical Status.

Number of Females	Income Level		
	Less Than Rs. 1499 [Lower]	Rs. 1500-2999 [Middle]	Rs. 3000 + [Higher]
256	78	98	80
Mean	13.55	1372	14.25
S.D.	1.68	1.43	1.44
S.E.	0.24	0.19	0.21

Table 11 : Number and Percentage Distribution of Contraceptive Non-user Females According to their Age Groups.

Age Group	No.	%
14-18	20	11.36
19-23	8	4.54
24-28	22	12.5
29-33	22	12.5
34-38	30	17.04
39-43	24	13.64
44-48	22	12.5
49-53	6	3.41
54-58	4	2.27
59-63	12	6.82
64-68	4	2.27
69-73	2	1.14
TOTAL	176	100.00

Table 12 : Number and Percentage Distribution of Contraceptive User Females According to their Age Groups.

Age Group	No.	%
14-18	18	22.5
19-23	24	30.00
24-28	16	20.00
29-33	10	12.5
34-38	6	7.5
39-43	4	5.00
44-48	2	2.5
49-53	—	—
54-58	—	—
59-63	—	—
64-68	—	—
69-73	—	—
TOTAL	80	100.00

Table 13 : Distribution of Marriage Conception Intervals of 162 Females who had never used Contraception According to their Present Age.

Marriage Conception in Months	<20	20-29	30-39	40-49	50-59	60-69	70+	Total
0-6	—	—	—	—	—	—	—	—
%	—	—	—	—	—	—	—	—
7-12	2	8	8	12	—	—	—	30
%	33.33	23.53	15.38	28.57	—	—	—	18.52
13-18	—	—	—	—	—	—	—	—
%	—	—	—	—	—	—	—	—
19-24	4	6	14	16	4	2	—	46
%	66.67	17.65	26.92	38.10	40.00	12.5	—	28.4
25-30	—	—	—	—	—	—	—	—
%	—	—	—	—	—	—	—	—
31-36	—	12	14	—	—	—	—	26
%	—	35.29	26.92	—	—	—	—	16.05
37-42	—	—	—	—	—	—	—	—
%	—	—	—	—	—	—	—	—
43-48	—	2	4	6	4	8	—	14
%	—	5.88	7.69	14.29	40.00	50.00	—	14.81
48+	—	6	12	8	2	6	2	36
%	—	17.65	23.08	19.04	20.00	37.5	100.00	22.22
Total	6	34	52	42	10	16	2	162
%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 14 : Distribution of Pregnancy and Pregnancy outcome of Mothers According to their Present Age.

Present Age In Years	No. of Wives	Number of Preg-nancies	Carrying Child		Pregnancy Out Come								Total Number Foetal Wastage	
					Live Births		Still Births		Artificial Abortion		Spontaneous Abortion			
			No	%	No	%	No	%	No	%	No	%	No	%
15-24	56	72	2	50 00	66	1.15	—	—	2	33.33	2	14.29	4	5.5
25-34	74	202	2	50.00	194	32.77	8	21.05	—	—	—	—	8	8.9
35-44	60	162	—	—	138	23.31	16	42.11	2	33.33	6	42.86	24	14
45-64	30	122	—	—	122	20.61	—	—	—	—	—	—	—	—
55-64	16	64	—	—	46	7.77	12	31.58	—	—	6	42.86	18	28
65-74	6	30	—	—	26	4.39	2	5.26	2	33.33	—	—	4	13
Total	242	652	4	100.00	582	100.00	38	100.00	6	100.00	14	100 00	58	100
%		100.00	0.61		90.8		5.83		0.92		2.15		8.9	

Table 15 : Reproductive wastage [Foetal Death] among the mothers according to their Present Age.

No of Foetal Deaths	15-24	%	25-34	%	35-44	%	45-54	%	55-64	%	65-74	%	Total	%
1	4	14.29	4	14.29	12	42.86	-	-	8	25.57	-	-	28	100
2	-	-	2	16.66	6	50.00	-	-	2	16.66	2	16.66	12	100
3	-	-	-	-	-	-	-	-	2	100.00	-	-	2	100
No. of Mothers Reporting Foetal Death [A]	4	9.52	6	14.28	18	42.86	-	-	12	28.57	2	4.76	42	100
Total Mothers [B]	54	22.5	74	30.83	60	25.00	30	12.5	16	6.67	6	2.5	240	100
Percentage of Mothers Miscarrying [A/B]	7.41	-	8.11	-	30.00	-	-	-	75.00	-	33.33	-	17.5	-
No of Foetal Deaths [C]	4	6.89	8	13.8	24	14.38	-	-	18	31.03	4	6.89	58	100
Mean no. of Foetal Death [C/B]	0.07	-	0.11	-	0.4	-	-	-	1.13	-	0.67	-	0.24	-
Total Pregnancies Excluding Artificial Abortion [D]	70	10.84	202	31.26	160	24.77	122	18.89	64	9.91	28	4.33	646	100
Foetal Deaths per 1000 Mothers [C/BX100]	74.04	-	108	-	400.0	-	-	-	1125	-	666.67	-	241.67	-
Foetal Deaths per 1000 Pregnancies [C/Dx1000]	57.14	-	39.6	-	150.0	-	-	-	281.2	-	142.86	-	89.78	-

Table 16 : Biological Events among the Mothers according to their Educational Attainments.

Events	Lilliterate		Literate	
	Mean	S.D.	Mean	S.D.
Age of Menarche	13.93	1.53	13.57	0.51
Age at Marriage	15.86	0.25	16.10	0.43
Marriage Conception Intervals (Months)	32.85	2.73	40.62	6.08
Mean No. of Live Birth	2.41	—	2.49	—
Mean No. Dead Childern	0.30	—	0.19	—
Mean No. of Foetal Death	0.29	—	0.14	—

Table 17 : Biological Events among the Mothers according to their Socio-Economic Status.

Events	Less Than Rs. 1499 [Lower]		Rs. 1500-2999 [Middle]		Rs. 3000+ [Higher]	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Age of Menarche	14.24	1.68	13.72	1.43	13.35	1.43
Age at Marriage	13.55	1.68	13.72	1.43	14.24	1.44
Marriage Conception Intervals (Months)	26.76	0.06	40.07	6.71	39.45	7.46
Mean No. of Live Birth	2.43	—	2.68	—	2.22	—
Mean No. Dead Childern	0.41	—	0.23	—	0.16	—
Mean No. of Foetal Death	0.27	—	0.26	—	0.19	—

Table 18 : Age at Menarche of Santal Girls (N = 114)

Age at Menarchy (Years)	Frequency	Percentage	Cumulative Frequency
10	2	1.7	1.7
11	6	5.3	7.0
12	26	22.8	29.8
13	32	28.1	57.9
14	27	23.7	81.6
15	18	15.8	97.4
16	3	2.6	100.00
TOTAL	114	100.00	

Table 19 : Distribution of Anthropometric Variables/Index of Menstruating and Non-Menstruating Santal Girls.

Age (Years)	N		Height (cm)		Weight (Kg)		BMI (Kg/m ²)	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
10	51	0	130±7	—	24.01±2.8	—	14.21±1.7	—
11	45	2	134±7	148±8	27.31±4.2	*38.84±7.6	15.21±1.4	*17.73±2.8
12	54	3	140±8	149±3	29.87±3.1	34.77±4.9	15.28±1.8	15.88±1.3
13	20	21	142±9	*148±8	30.51±4.2	^39.52±4.7	15.28±1.8	^15.88±1.3
14	14	31	145±8	151±8	34.54±5.1	^39.86±5.4	16.43±1.9	*18.08±2.9
15	4	23	146±6	152±6	34.46±3.2	^39.77±4.1	16.26±1.5	*17.88±2.9
16	2	19	150±7	153±7	41.28±2.3	40.31±5.3	18.54±0.1	17.43±1.9
17	0	15	—	153±6	—	43.56±8.1	—	18.28±2.1
	190		114					

*. $p < 0.05$, ^ $p < 0.01$, means are given \pm SD.

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The Serious non-infectious diseases in human populations and urbanization ('Westernization')

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There is a rapidly increasing incidence of the chronic diseases throughout the world with accompanying economic development and urbanization. Chronic diseases are generally non-infectious and tend to persist and worsen in economically developed countries in North America, Europe and developed areas elsewhere. These diseases have been the chief causes of morbidity and mortality for many years. Some of these are *disagreeable* or *debilitating* (for example, tooth decay, obesity, constipation and other gut disorders), some can be or are *disabling* (like adult-onset diabetes, hyperlipidaemia, hypertension, angina and osteoporosis), and some are *deadly* (like stroke, heart diseases and cancer).

The pattern of adult diseases has changed dramatically and in many, if not most, developing countries, circulatory diseases, including coronary heart diseases and cancer, have become the leading causes of death. World Bank and World Health Organization have projected steep rises in the incidence of these and other chronic diseases in developing countries. Even in rich countries, chronic diseases are a tremendous social and economic burden. But, developing countries do not have the financial or human resources to treat the new epidemics of chronic diseases on a national basis. Further, these countries like India suffer the triple burden of epidemic nutritional deficiencies, infectious diseases and chronic diseases. The only rational approach to epidemic chronic diseases is prevention.

A major factor of human modernization and urbanization is epidemiological transition. This shift from infectious to non-infectious diseases worldwide has been classified (Omran, 1971) whereby pandemics of infection are gradually displaced by degenerative and man-made diseases as the main cause of death.

The developed regions in the western world are currently well advanced in this stage of degenerative and industrial disease, with almost two-thirds of all deaths contributed to by these major diseases.

Now, a significant bio-social anthropological contribution is recognized in comparative epidemiology. Essentially, the entire industrialized western world has completed the epidemiological transition. It is here that the vast majority of medical facilities including trained medical practitioners and researchers are present. Yet, epidemiological surveys in these populations designed to identify determinants of chronic diseases, observe only a small portion of the socio-environmental variability, i.e., at the upper end of the continuum from traditional rural conditions to urban industrialized conditions.

We have to recognize that an outlook to include populations in plainer, more 'ancestral' circumstances pin-pointing correlative variables across this epidemiological transition can help us to explain the development of modern chronic disease patterns. However, modern medical professionals in the developing regions of the world and in the western world do not seem to be prepared or inclined to look at this type of variation, which, you will agree, necessitates a cross-cultural approach.

There are however some persons (like Trowell and Burkitt, 1981) who have refined the notion of "diseases of civilization" calling them instead "western diseases". However, the major trend of heart and hypertensive diseases and cancer, together with diabetes remain the prominent examples in various classifications of western diseases.

Various cross-cultural surveys of coronary heart disease and cardiovascular conditions have contributed much in classifying aetiological factors. Taking a comprehensive view of some studies conducted in this direction seem to have demonstrated that a variety of ethnic groups with low prevalence in traditional environments acquire higher levels of these conditions within one generation of immigration to fully developed countries. Immigrant Punjabis to United Kingdom are the best examples to this situation. Any conceivable kind of human genetic change can be ruled out as a factor of this change, because the change seems to be simply too rapid. This contrasts with the earlier situation — based arguments for the acquisition of heart disease in people in the developed regions of the world. Risk factors predicting the development of cardiovascular disease such as blood pressure have been consistently shown to rise with urbanization, but the transition is fairly immediate. Diet and fatness are important from childhood for determining the disease patterns of adults. The change is usually seen in the first generation offspring of migrants. Information on dietary factors plus sedentary lifestyle and mental stress have allowed a meaningful programme of prevention to evolve; the idea of genetic causation of the new disease pattern has disappeared. However, a genetic factor in relative susceptibility to new environmental conditions is recognized.

In this part of the world, rheumatic heart disease seems to be common in older inhabitants of under developed and rural habitats, with tobacco usage being a major risk factor, but cardio-pulmonary and hypertensive disease assume predominance in urban industrialized areas and affect younger persons, with psychological stress, over-weight, hypercholesterolaemia and lack of exercise considered as major factors.

Diabetes mellitus among the adults is a western disease, and although there is a variation in genetic predisposition to development of diabetes, all surveyed ethnic groups or populations show increase with urbanization, modernization and industrialization. In India, all surveyed areas show first

generation increase in diabetes simultaneously with income, obesity, carbohydrate diet, inactivity and urbanization. As with heart disease, the change is too rapid to allow consideration of explanatory models of genetic adaptation. Accordingly, this is clearly an environmental epidemiological transition; population differences in genetic predisposition or susceptibility have predated the transition.

With this background information, let us come to our (i.e., me and my associates) own work in this direction during the last about three decades. The Punjabi population in and around Chandigarh, shows several special bio-social characteristics of value for study of the epidemiological transition. Over a short geographic distance eastern (or Indian) Punjab communities cover the entire spectrum from urban, modern, sedentary professional levels to rural villages in which the agricultural way of life and reduced circumstances typical of longstanding country side isolation have been little changed. The planned capital city of Chandigarh was started just about half a century ago as a part of the rehabilitation scheme for the immense displaced population that migrated under sudden duress from West Punjab (now in Pakistan) after the 1947 partition. The urbanization phenomenon has been compressed into the relatively short intervening time; the city has one of the highest per capita incomes in the country. Migrants to the city inhabit characteristic areas and are easily discriminated from the long-term urban residents whose degree of modernization/urbanization/westernization is almost completely predictable from income level. And, clinicians and researchers have been finding serious western diseases rapidly on the rise in the urban population.

When restricted to Punjabis, the population clearly represents a single, common gene pool of essentially freely interbreeding individuals. In this genetically controlled study situation where fatal western diseases are rising, we resolved to take a purely cross-sectional survey approach, contrasting alike-aged rural and urban youths (around 12-15 years) to find the answer.

The results from the three most conspicuous diseases (dental malocclusion, myopic visual defects and allergy or asthma) revealed very interesting results.

Dental Occlusal Variation :

Oral examination and wax-bite impression study yielded data on six different occlusal variables measuring tooth rotation and displacement, over-bite, over-jet, maxillary collapse, and antero-posterior and transverse discrepancies in bite. We compounded these measures into a summary variable. This did not vary according to sex. Rural youths had quite significantly lower values than urban youths. The detailed results confirmed a widely documented rural – urban dichotomy in occlusal health. And, correlation with environmental variables allowed us to rule out a spectrum of causal factors. These are inbreeding,

genetic crossing, accumulation of mutations, interstitial attrition, caries, periodontal disease, and allergy-related oral breathing. Sleeping posture, thumb sucking and tongue thrust habits, though not controlled, did not assist interpretation in the context of epidemiological transition; for instance, rural children seem to suck their thumbs more than urban. The old anthropologically – generated thinking of dietary consistency leading to chewing stress necessary for occlusal development offers a straightforward explanation of the transition and later we found confirmation by recording vertical bite forces with a portable strain – gauge apparatus. Rural youths showed stronger increase with age and sex dimorphism than urban youths in bite force; thereby showing that rurally, the development of masticatory and facial structures may depend upon functional masticatory demand.

Visual Defects and Refractive Error :

Myopia or shortsightedness is a disease that mirrors the situation as described for dental occlusion. Genes have been considered the determining reason by researchers and clinicians, but not much thought has been given to other causes. However, some cross-cultural epidemiological studies have earlier (during fifties and sixties of the last century) shown better eyesight in rural versus urban samples and in urban-schooled Eskimo parents versus their educated children. American Indians as well as Eskimos have their eyesight well suited to their nomadic and hunting society, an example or adaptation. However, they show refractive error increase within one generation upon acquisition of reading habits. Similarly, the findings that more educated, highly academic populations have more myopia because obviously they spend more time reading and thus, seem to have more genes for myopia.

For studying the visual epidemiological transition, we made observations on visual activity in rural as well as urban 12 to 16 years olds in Punjab schools.

[Using the international “Tumble-E” eye chart, compliance of the subjects was cent percent.]

The Punjabi youths studied indicated significantly better visual activity in rural youths (with lower daily amounts of near work and reading) than in urban youths. This confirms the broad trend referred to above for unacculturated or rural types of people to be relatively free of refractive error as compared to acculturated or urbanized, school-attending subjects. We found that rural youths spent a median two hours a day reading, compared to a median of about six hours for their urban counterparts. Thus, these conclusions seem to support functional-environmental thinking about myopia.

Chronic Allergy and Asthma :

Respiratory allergy, asthma and chronic oral breathing etc. seem to be urban and environmentally induced diseases. But, this syndrome is more complex than the previous two. An immunological response involving IgE has been

implicated in some white populations. Again, a strong familial tendency has been demonstrated in white groups. But immigrant studies indicate one generation change to western prevalence levels regardless of race. However, rural components have been seen to regularly have lower prevalence than urban. Chronic allergy was diagnosed for 21 percent of the urban youths and significantly lower (only 9%) in the rural youths. However, males were significantly more susceptible than females.

The environmental factors of possible significance for allergy have been found to include cow's milk in place of breast feeding, dust, certain insects, pollution and food additives, all of which are more prevalent in the urban environment, and response to parasite infestations.

Lower Back Pain :

Lower back pain is quite prevalent in urban people whether in the west or other developed area of the world. Basically, bipedal posture is responsible for this condition. Lower back pain (LBP) is generally higher in sedentary populations who maintain a particular posture for much of their time. A study by us revealed that 45% of the population of Chandigarh suffered from this pain, females suffering more (about 60%) than males (about 39%).

This pain is caused by degenerated disease of the lumbar spine (lower back) as a result of inactive life, long sitting or standing working hours and absence of exercise. Lack of mobility of the spine and poor posture prohibit development of strong muscles, which put extra strain on ligaments. The exposure to education, working in the same occupation for years, standing and/or sitting while working, alcohol consumption, driving for long were factors found to increase the risk of LBP. The lowest risk factors found, however, were marital status and residency, i.e., urban or rural.

Hypertension :

In a study conducted on the white-collar workers of the Panjab University Campus, including members of the faculty, who hailed from Punjab or, were having a common gene pool and aged between 25 and 55 years, the prevalence of hypertension found is about 17% in males while it is about 13% among females. On the whole, the incidence of blood pressure is about 4% more as compared with adult population of the Chandigarh city suffering from hypertension.

Diabetes :

The prevalence of NIDDM (non-insulin-dependent *diabetes mellitus*) in the Punjabi population from North India who were hospital admittees gave a higher prevalence of about 8 to 9% in urban areas as compared to about 2% in rural areas. This difference is probably the outcome of respective lifestyles. Moreover, urban residents are about 4 times more likely to develop diabetes

than are rural residents. The low prevalence, of NIDDM in the rural sample indicates that the traditional lifestyle protects against this disorder. The evidence from the Punjabi population for prevalence of obesity, hypertension, physical inactivity and alcohol consumption across urban-rural dichotomy undoubtedly suggests that a combination of aetiological factors precipitate NIDDM in susceptible individuals. The difference in prevalence needs to be understood in the context of epidemiological transition along with other risk factors and preventive programmes supporting a healthy lifestyle need to be recognized and recommended.

Growth of Sub-cutaneous Fat in Well-off Chandigarh Children

A. K. BHALLA

Skinfold thicknesses are valid measure of sub-cutaneous fat in human body. These are often used for assessment of overnutrition (Seltzer et al 1965, Seltzer 1967), obesity (WHO 1995) and undernutrition (Keet et al 1970) in individuals. Age and sex specific sets of data on skinfold thicknesses emanated from United States (Ferris et al 1979, Owen 1982, Johnson et al 1981), Sweden (Karlberg et al 1968), England (Tanner & Whitehouse 1975) and Hungary (Eiben and Panto 1986) have widely been used as reference standards to compare and evaluate degree of adiposity amongst human subjects in different parts of the world.

In contrast to children from Western world, similar sets of data on growth of different anthropometric measures of sub-cutaneous fat amongst children of Indian origin are scant. However, some information published by earlier workers (Pathak 1989, NFI 1989, Bhasin et al 1990, Raghavan et al 1974, Singh et al 1987, Agarwal et al 1992) is noteworthy. The majority of these studies were cross-sectional in nature and depicted great population specific variability as far as the pattern of growth of some selected skinfold thicknesses in children was concerned. In view of the great environmental, socio-economic & ethnic diversity encountered for growth of sub-cutaneous fat amongst children particularly, during adolescence amongst regional populations of India, reference data generated for one segment of population may not be of much utility to assess precisely degree of adiposity in individuals belonging to another population. Hence, for obvious reason, there is need to establish age, sex and population specific reference data for comparative purpose to evaluate adiposity status of children residing in our country. Owing to non-availability of convincing serial data on growth of sub-cutaneous fat of children inhabiting North Western region of our country in this presentation, an attempt has been made to study pattern of growth of triceps, sub-scapular and mid-axillary skinfold thicknesses in well-off Chandigarh children during adolescence using a mixed-longitudinal growth research design.

Material and Methods :

A total of 318 anthropometric examinations carried out on 134 boys aged 9 to 17 years and 278 examinations conducted on 109 girls between 9 to 16 years of age living in the Union Territory of Chandigarh (India) and enrolled in Growth Clinic of the Department of Pediatrics, Postgraduate Institute of Medical Education and Research, Chandigarh (PGIMER), comprised the sample for this mixed- longitudinal study. These children belonged to well-

off socio-economic strata of Chandigarh, (UT) and did not suffer from any disease or deformity etc. and in general, enjoyed normal health status during entire tenure of this study.

Every child included in this study was measured for triceps, sub-scapular (Weiner & Laurie 1969, Tanner & Whitehouse, 1975) and mid-axillary (White 1963) skinfold thicknesses using standardized techniques and instruments in Growth Laboratory of the Department of Pediatrics, PGIMER, Chandigarh on pre-appointed date and time at six monthly age intervals with a time tolerance of ± 15 days up-to 13 years and whereafter, they were examined at yearly intervals. The skinfold thicknesses were measured with a Harpenden Skinfold Caliper (make: Holtain Ltd.) with least count of 0.2 mm. The children who failed to reach Growth Clinic/lab on pre-appointed dates and time were also followed up at their homes. Age and sex-wise distribution of children who could be examined during different follow-ups is shown in Table 1.

Besides, anthropometric examinations a personal data sheet for each child, bearing information regarding child's name, sex, date of birth, place of origin, address, occupation & education of parents and total monthly income etc. of the family was also noted in the beginning of study. A 24-hour recall method was used to record dietary intake of every child during each visit. A routine general health check up of every child was also done. None of the children enrolled in this study suffered from any serious complication and no-hospitalization was reported.

Tanner's (1951) method was used to compute distance statistics in terms of Mean and SD(s) from mixed-longitudinally gathered data for each of the three skinfolds measured amongst children of the two sexes. The magnitude of gender differences was quantified by applying Student's un-paired t-test.

Results and Observations :

Mean and Standard Deviation computed for triceps, mid-axillary and sub-scapular skinfold thicknesses measured amongst both well-off Chandigarh boys and girls at different age levels are shown in Tables 1-3.

With regard to the growth of triceps, mid-axillary and sub-scapular skinfold thicknesses no consistent trend was noticed for both well-off Chandigarh boys and girls during the entire tenure of the study. Girls in general, possessed higher mean values for all the three skinfold thicknesses than the boys of same age, and magnitude of sex differential for these measures of sub-cutaneous fat remained statistically significant at most of the age levels (Tables 1-3). A general trend for more accumulation of fat in children of the two sexes during the latter half of adolescence than the former one was noticed for each of three skinfold thicknesses presented in Tables 1-3.

Discussion :

In the present study distance growth pattern of sub-cutaneous fat amongst well-off Chandigarh adolescents measured in terms of triceps, mid-axillary (lateral-

thoracic) and sub-scapular skinfold thicknesses have been obtained by using a mixed-longitudinal growth study design. With regard to each of these three measures of body fat no-consistent increase in the mean values was recorded in both boys and girls with the advancement of chronological age. However, exception to this were girls who beyond 13 years of age have shown regular gain in mean values when compared with boys of the same age.

It was noted that girls in general, remained fatter than their male counterparts throughout the span of study and the magnitude of sex differences favouring girls also remained statistically significant at majority of the age levels (Tables 1-3). It was interesting to note that maximum deposit of sub-cutaneous fat amongst children of the two sexes was recorded at the level of triceps, and the minimum was for mid-axillary skinfold thickness. Sub-scapular skinfold thickness enjoyed an intermediate position.

Inter-population comparison reveals that Chandigarh boys possessed higher means for both triceps and sub-scapular skinfold thicknesses than those recorded in British (Leeds) children (Buckler 1990). On the contrary, girls representing the present study remained thinner than their Leeds counterparts (Buckler, 1990) till 13 years of age whereafter, they took lead over girls of British origin. These differences appeared to be inter-racial in origin.

In contrast to their other Indian counterparts (Agarwal et al 1992) both Chandigarh boys and girls in general, possessed lower mean values for triceps skinfold thickness. On the other hand they remained fatter than affluent Punjabi children (Pathak 1989) as well as also than those studied by Raghavan et al in 1974 throughout the period of adolescence. Also as compared to affluent girls studied by NFI (1989) in Delhi, Chandigarh girls possessed lower values for triceps skinfold thickness upto about 13 years whereafter, they became fatter till 15 years of age. Our girls were also found to possess substantially lower mean triceps values than those studied by NFI (1989) in Coimbatore.

For sub-scapular skinfold thickness both well-off Chandigarh boys and girls possessed lower mean values than their affluent counterparts studied by Agarwal in 1992 in different parts of India. On the contrary, our children remained fatter for this measure of sub-cutaneous fat than the affluent Punjabi children of the two sexes studied in Ludhiana by Pathak (1989). The girls hailing from Coimbatore as well as Calcutta NFI (1989) as evaluated in terms of sub-scapular thickness were also found to be substantially fatter than their counterparts studied by us at Chandigarh.

In view of the non-availability of appropriate sets of comparative data for mid-axillary skinfold thickness inter-population comparison for this measure of subcutaneous fat could not be attempted. However, Chandigarh girls in general remained fatter than boys throughout the age range considered.

From above discussion it becomes amply clear that in contrast to some of their affluent counterparts (Raghavan et al 1974, Pathak 1989) Chandigarh children possess higher mean values for selected skinfold thicknesses while

they in general, remain relatively thinner as compared to other ones (Agarwal et al 1992, NFI 1989). This speaks of existence of substantial degree of population specific variability prevailing amongst Indian children as far as growth of sub-cutaneous fat is concerned, which may be attributed to ethnic factors since ,our sample subjects represented well-off socio-economic strata of Chandigarh (UT), and did not experience any dietary and other health related constraints and conditions during the entire span of this serial study.

The values presented for skinfold thicknesses in well-off Chandigarh children may be used for comparative purpose to assess the level of adiposity amongst children representing this region of the country.

Table 1 : Mean, SD of Triceps Skinfold Thickness (mm) in Well-off Chandigarh Boys & Girls.

Age (±yr.)	Boys			Girls			Sex Difference (t-values)
	•N	Mean	SD	•N	Mean	SD	
9.0	35	8.6	3.8	29	11.8	4.3	3.11**
9.5	35	10.0	5.3	34	12.3	4.2	1.97*
10.0	26	9.3	4.2	35	12.3	4.7	2.54*
10.5	31	10.1	4.7	32	13.1	5.7	2.24*
11.0	38	9.8	4.6	27	12.4	5.1	2.11*
11.5	25	10.1	4.0	32	11.3	3.5	1.18
12.0	23	10.7	4.9	14	11.8	4.2	0.68
12.5	21	12.1	6.6	17	11.1	4.1	0.63
13.0	38	11.2	5.9	20	11.5	3.9	0.21
14.0	20	10.1	4.8	14	15.0	5.1	2.97**
15.0	11	10.1	4.8	12	16.0	4.8	2.97**
16.0	7	9.1	2.6	12	16.1	6.0	2.88**
17.0	8	9.6	4.9	—	—	—	—
	318			278			

* $p \leq 0.05$

** $p \leq 0.01$

• No. of children examined during different follow-ups.

Table 2 : Mean, SD of Mid-axillary Skin-fold Thickness (mm) in Well-off Chandigarh Boys & Girls.

Age (\pm yr.)	Boys Mean SD		Girls Mean SD		Sex Difference (t-value)
9.0	6.1	3.0	7.8	3.4	2.09*
9.5	7.6	5.4	9.4	4.4	1.49
10.0	6.5	3.3	9.2	4.4	2.58**
10.5	7.5	4.2	9.6	5.2	1.73
11.0	7.0	4.1	9.0	4.4	1.85
11.5	6.6	2.5	7.8	4.2	1.24
12.0	7.3	3.7	7.5	2.5	0.17
12.5	9.4	8.0	8.4	3.5	0.47
13.0	8.7	5.8	8.3	2.7	0.31
14	7.5	4.9	10.6	3.9	2.08*
15	8.4	4.3	10.6	3.6	1.36
16	7.4	1.7	13.3	4.8	3.03**
17	8.1	3.6			

* $p \leq 0.05$

** $p \leq 0.01$

Table 3 : Mean, SD of Sub-scapular Skin-fold Thickness (mm) in Well-off Chandigarh Boys & Girls.

Age (\pm yr.)	Boys Mean SD		Girls Mean SD		Sex Difference (t-values)
9.0	6.3	3.1	8.6	3.7	2.66**
9.5	8.5	6.2	9.6	5.1	0.79
10.0	6.9	3.7	8.9	4.3	1.87
10.5	8.0	4.4	10.5	5.7	1.91
11.0	7.7	4.1	10.2	4.1	2.38*
11.5	6.9	2.4	9.1	4.5	2.17*
12.0	8.1	4.3	8.8	2.4	0.54
12.5	10.5	6.9	9.6	3.8	0.38
13.0	9.1	6.6	10.2	3.5	0.73
14.0	8.7	5.0	12.5	5.2	2.23*
15.0	10.3	5.3	12.9	5.5	1.16
16.0	11.2	5.0	15.4	4.8	3.71**
17.0	9.9	3.2	—	—	—

* $p \leq 0.05$

** $p \leq 0.01$

*** $p \leq 0.001$

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Portage Pathway : Successful inclusive Pre-school Teaching

TEHAL KOHLI

When you ask me what I've done at school
Today,
And I say, "I just played".
Please don't misunderstand me.
For, you see, I'm learning as I play.
I'm learning to enjoy and be successful in my work.
I'm preparing for tomorrow.
Today, I AM A CHILD AND MY WORK IS
PLAY.

Author Unknown

And this is what Portage service is. It is one of the most recent innovative **Service Delivery Model** for education and training of the delayed young children from birth to six years. *It originated as home-based, step-by-step, skill by skill, systematic teaching system* which involved parents as therapists for reducing the developmental delays of the young children. But in its short history of 25 years, many more easily accessible Portage Models have been developed (Cameron, 1997; Kohli, 1985a, 1985b, 1990, 1998, 2001; Shearer, 1993).

Portage is primarily a play way, skin or activity centred approach involving the existing infrastructure of **Professionals, Paraprofessionals** and **Non-Professionals** and especially the last mentioned existing community resources in the form of parents, community workers, anganwadi workers etc. Above all portage service delivery system suits the slow budding minds with the concrete level of thinking in the **regular class-rooms** in an '**Inclusive**' setting.

Prevalence of Disability in India and Manpower Requirement

India's population today equals world's total population in 1804 (1 billion). Interestingly, after a gap of 123-years, the world population touched 2 billion mark in 1927. Just after 47 years gap, the population of the world increased further to 4 billion in 1974. Thereafter, 1 more billion people was added only during the next 13 years, i.e. 5 billion in 1987. Surprisingly 1 billion was added only during the next 12 years, i.e., 6 billion in 1999. The population of India was 250 million during 1919, which increased to 500 million in 1966 after a gap of 47 years. After 33 years, India touched 1000 million mark during 2000 (Census of India, 2001, Directorate of Census Operations, Haryana).

As per the modest figures of **WHO**, 10 percent of the total population have **Disabilities** of one kind or the other. So, at least 100 million (**10 crores**)

of India's population need **special attention**. *This excludes the figures of those who are suffering from learning disabilities, epilepsy, ADD, chronic mental illnesses etc. Fig. To further throw light on this.*

As quoted in the 'Report on **Manpower Development**' (RCI, Jan. 1996), the magnitude of the problem of Rehabilitation in India is of such vast proportion, cost of *manpower development is so high that the problem of manpower development should be dealt with in phases and Five Year Plans or with some other alternatives.*

Portage Pathway : Successful Class-room Pre-School Teaching

So, in a country like India, **Inclusive Teaching** is a worthwhile move and a very satisfying trend for various types of childhood disabilities, especially mild disabilities. This leads to reduction in stigma and enhancement of development of toddlers, pre-scholars in all areas and at all levels of intelligence. '**Education for All**' Summit (1990) also stressed upon this principle. Inclusion 'zero neglect' are some of the synonyms used.

Special educators, psychologists and mental health workers all believe that developmentally delayed or mild mentally retarded individuals can maximize their potentials in all areas of development in an inclusive class-room setting which responds well to their biological, social and psychological needs by providing the best environmental stimulations.

So after realizing the silent emergency to expand **Early Intervention (EI)** services, the present author thoroughly appraised the innovative and comparatively cheap helping strategies for education and training of the mentally retarded and felt a dire necessity of initiating for the first time in Northern India, a **Portage Project Training as EI programme** which could appropriately serve the needs of maximum number of mentally retarded/developmentally delayed children with minimum of economic resources and with existing human resources (Kohli, 1985a, 1985b, 1985c, 1986, 1990 etc.). Later, the present author laid her hands on experiments with Portage as used in regular class-rooms (Thapar and Kohli, 1992; Kohli and Shearer, 1998).

In brief, more than **25 action – oriented researches** done by the **investigator** or supervised by her at M.A. (Edu.), M.Ed., M.Phil. Ph.D levels and various research projects sponsored by National and International Bodies time and again have confirmed the utility of Portage training under different Models and also confirm that so far, this is '**The Best**' available **Institution as well as community Based 'Early Detection and Early Intervention' Model** for developmentally delayed/MR young children from birth to 6 years. Research studies have also shown that this training of early stimulation can be equally effectively used for enhancing developments in the areas of motor, cognitive, emotional, social, language developments and development of self-help skills of delayed children in particular and average and bright children in general (Fukumoto, 1999; White, 1999; Yamaguchi, 1999).

So, now the concern of the presenter of this paper is not whether Portage is a Inclusive Model or not as it is very clear that Portage is a **powerful Inclusive Model** for early intervention and for which governments are looking for, but the concern is **how to integrate this Model** in services for developmentally delayed/MR children in regular classes, in anganwadis, in pre-nurseries, in nurseries, in balwadis etc. And more intense concern is as to how to **approach**, influence and convince the **policy makers, planners and administrators** about the utility of this Model and how to develop proper strategies to integrate the same in regular class-rooms for the challenged children in India. Lets all join hands for the same.

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A Study on The Detection Of Mental Retardation Among The Primary School Pupils Of Agartala (Tripura).

SURENDRA NATH BANERJEE

Mental Retardation (MR), which is not a disease but a constellation of syndromes, has remained as the most ignored and least regarded of all children. MR refers to sub average general intellectual functioning which originates during the developmental period of the children and is associated with the impairment in their adaptive behaviour. According to the World Health Organisation (WHO) "The problem of mental retardation is of socio-cultural origin, where the educational and social performance is markedly lower than would be expected from what is known of their intellectual abilities." According to the latest Census report about 2% of the total population of the whole country are mentally retarded. MR is not simply a psychological or medical problem but it is also an important social and cultural problem and is met within the families irrespective of income, education, caste and community. The untold amount of misery, suffering and emotional distress that it causes to the parents and others in connection with these unfortunate children have a great bearing on the problem of their management.

The nature of MR, its kinds, cause and scope are complicated and widespread, and all its dimensions cannot be covered in a single study. Profound and severe mentally retarded children present complicated physical and psycho-neurological symptoms and problems which require life long intensive and extensive residential medical and nursing care. They are mostly incapable of profiting from any type of training and education. On the other hand moderately and mildly mentally retarded which are by far the largest group (about 85% of all retarded) are composed of those individuals for whom there is no demonstrable pathology in the brain and central nervous system. They are usually slow in development. Their motor development is relatively normal, their eye-hand coordination is somewhat below normal expectancy. They usually enroll themselves in the regular primary schools, but they are hardly identified as mentally retarded due to lack of screening by proper psychological assessment in these schools. Usually they are incapable of following the daily school teaching at par with the normal pupils due to their slow learning process. But they can profit from special care, education and training. Their social and communication skills may be developed in carefully structured special class and related educational programme by which they may overcome the secondary school requirements also.

The present study has been conducted in and around Agartala city. Their population consists of mainly Bengalees and Chakmas. They also have a high percentage of tribal population from its hill region which are Riangs, Tripurries, Jamatias etc. They are mainly service holders in government and non-government offices and businessmen.

In spite of the gravity of the problem presented by the mentally retarded pupils in the primary schools no such study has been done so far. Moreover North-Eastern States are neglected in many spheres particularly they are kept out of the ambit of this sort of educational research. So the present study aims to detect the moderately and mildly mentally retarded pupils from the primary school population of the North- Eastern State of Tripura and conduct a socio-psychological study of these pupils in order to obtain the underlying factors which are responsible for their retardation.

Methodology

Sampling : For a representative population of the present study seven primary schools have been selected randomly from the lists of primary schools of Agartala city by Circular Systematic method of sampling. Data has been collected from 20 class-IV pupils on the average of both sexes also selected randomly from each of these schools. So altogether 162 pupils have thus been tested.

Tools Used : Raven's Coloured Progressive Matrices Test (CPM, 1984 edition) have been used to assess the intelligence level of the selected pupils. The rationale behind the use of Raven's CPM test is not only for its non verbal character to be easily used upon the multilingual pupils but also its uniqueness in appraising pupil's ability of simultaneous or instant cognitive processing, intellectual reasoning, accuracy of discrimination, analogies and other logical relations.

Besides this test, three schedules specially designed for this study have been campaigned each from the selected pupils, their guardians and their class teachers in the schools. These schedules consisting of information regarding pupils, their socio-economic demographic condition, educational background of their parents, pupil's relation with parents, teachers, siblings, classmates and other children of their neighbourhood, method of teaching, etc.

Results and Discussion

From the obtained results the estimated mean scores and standard deviations obtained by the primary school pupils of the seven selected schools in Raven's Coloured Progressive Matrices test is shown in table-1 below.

Table 1 : Schoolwise estimated proportion of Mean scores and Standard Deviations Obtained by the primary school pupils in the Raven's Coloured Progressive Matrices Test.

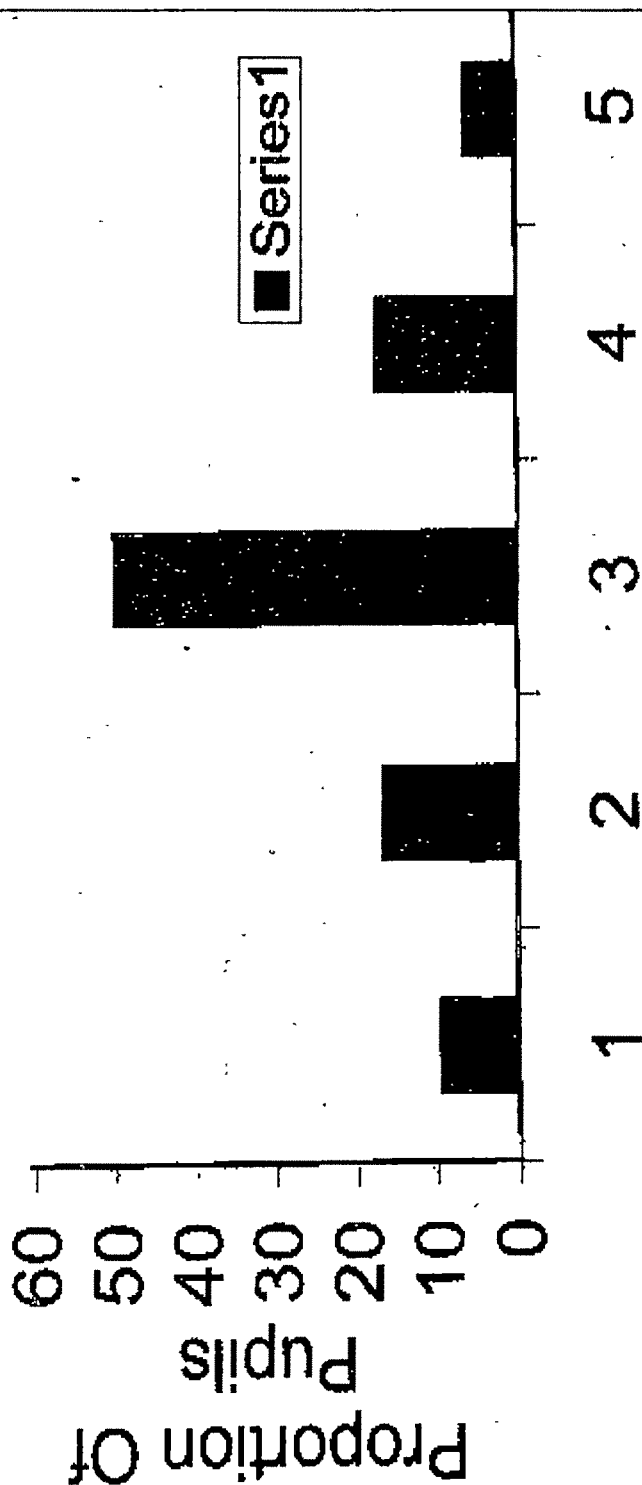
Schools	Raven's Coloured Progressive Matrices	
	Mean	S.D.
Sishu Bihar	18.55	7.45
Umakanta	18.46	7.14
Bijoi Kumar	20.38	7.71
Sakhicharan	20.32	7.17
Ramkrishna Ashram	19.89	6.95
M. T. Girls'	19.11	6.91
Netaji Subhas	19.56	6.94
Agartala	19.47	7.17

From the results (Table-1) it is revealed that the mean scores obtained by the primary school pupils of the seven primary schools of Agartala are in the range of 18.46-20.38 and the standard deviation range is 6.91-7.71, whereas average estimated mean scores and standard deviation obtained by the pupils of Agartala are 19.47 and 7.17 respectively. On the basis of obtained scores and the percentile ranks the intelligence level of the primary school pupils of the seven primary schools and Agartala town as a whole have been calculated and is shown in table-2.

Table 2 : Schoolwise estimated proportion of primary school pupils according to their Intelligence level.

Schools	Intelligence Level				
	Superior	Above Average	Average	Backward	Borderline
	I.Q.level (Above 110)	(101-109)	(90-100)	(80-89)	(61-79)
Sishu Bihar	18.50	18.27	44.78	15.24	3.21
Umakanta	7.25	16.59	53.33	17.37	5.46
Bijoy Kumar	12.65	20.68	51.40	10.52	4.75
Sakhicharan	5.15	12.54	54.24	20.45	7.62
Ramkrishna Ashram	9.58	24.55	43.80	16.65	5.42
M. T. Girls	5.42	10.25	52.24	23.35	8.74
Netaji Subhas	9.78	13.74	51.31	18.42	6.75
Agartala	9.76	16.66	50.16	17.43	5.99

Chart - 1 : Schematic Representation Of The Primary School Pupils Of Agartala According To Their Intelligence Level



Superior Above Avr. Average Borderline Backward

From the obtained data (Table-2 and Chart.-1) it is revealed that on an average a sizable number of primary school pupils enrolled in the seven normal primary schools of Agartala city are found to be moderately mentally retarded. Among the schools M. T. Girls' (32.09%) has the highest number of mentally retarded pupils followed by Sakhicharan (28.07%), Netaji Subhas (25.17%), Ramkrishna Ashram (23.07%), Umakanta (22.83%), Sishu Bihar (18.45%) and Bijoy Kumar (15.27%). Thus the proportion of Mentally Retarded Primary School Pupils of Agartala town is 23.42%. Among them borderline cases are 8.74%, 7.62%, 6.75%, 5.46%, 5.42%, 4.75%, 3.21% and 5.99% in M. T. Girls', Sakhicharan, Netaji Subhas, Umakanta, Ramkrishna Ashram, Bijoy Kumar, Sishu Bihar and Agartala town itself.

There are some pupil-relevant background factors which are directly related with the mental retardation of the pupils and are also found in this study. These are, heredity, pupils' relation with their parents, siblings, teachers, classmates and neighbours; contention of parents in the presence of their children, parental separation, pupils' school attendance, following regular class teaching, interest in studies; and mode of rectification of pupils by parents and teachers for their disobedience. Proportion of mental retarded pupils according to these pupil-relevant background factors are shown in the tables below.

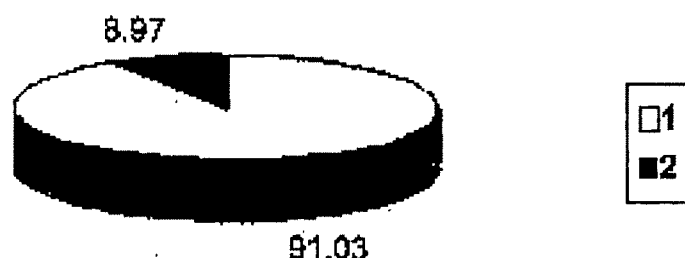
Table 3 : Schoolwise proportion of mentally retarded primary school pupils of Agartala according to the Heredity factor and their Parents contention before them.

Schools	Heredity		Parents contention before their children	
	Yes	No	Yes	No
Sishu Bihar	88.50	11.50	66.38	33.62
Umakanta	93.82	16.18	63.59	36.41
Bijoy' Kumar	86.68	13.32	72.25	27.75
Sakhicharan	91.72	8.28	61.47	38.53
Ramkrishna Ashram	92.35	7.65	65.52	34.48
M.T. Girls'	94.72	5.28	69.72	30.28
Netaji Subhas	89.45	10.55	75.16	24.84
Agartala	91.03	8.97	67.73	32.27

From the obtained results (Table-3 & Fig.-1) it is evident that heredity factor is directly related to the mental retardation of the primary school pupils. It is also revealed that parents contention before their wards have a positive effect for the mental retardation of their children. This is true for all the schools and the Agartala city itself.

Fig. 1

**Schematic Representation Of the
Primary School Pupils of Agartala
according to the Heredity Factor.**



**Schematic Representation of the
Mentally Retarded Primary school
pupils of Agartala according to their
parents contention before them.**



Table 4 : Schoolwise proportion of mentally retarded primary school pupils according to their relation with their parents, siblings, teachers, classmates and neighbours and also due to the separation of their parents.

Schools	Parents			Pupils' relation with Siblings			Teachers		
	Cord.	Indiff.	Stra.	Cord.	Indiff.	Stra.	Cord.	Indiff.	Stra.
SishuBihar	11.45	23.32	65.23	20.32	21.49	58.19	12.62	20.53	66.85
Umakanta	10.37	25.55	64.08	18.75	25.25	56.00	15.35	19.42	65.23
Bijoy Kumar	12.72	20.82	66.44	18.24	23.48	58.28	11.74	23.39	64.87
Sakhicharan	9.37	24.32	66.31	19.84	25.28	54.88	12.47	22.42	65.11
Ramkrshna As.	11.43	26.48	62.09	22.63	27.22	60.15	15.28	21.73	62.99
M.T.Girls'	13.65	24.51	61.84	20.30	25.65	54.05	17.86	21.39	60.75
Netaji Subhas	11.79	22.82	65.39	17.55	28.69	53.76	11.29	27.54	61.17
Agartala	11.54	23.97	64.49	19.66	25.29	55.05	13.80	22.34	63.86

Schools	Classmates			Neighbours			Parental Separation	
	Cord.	Indiff.	Stra.	Cord.	Indiff.	Stra.	Yes	No.
Sishu Bihar	15.32	22.67	62.01	12.37	23.78	63.85	86.24	13.76
Umakanta	17.84	24.35	57.81	15.48	25.69	58.83	88.56	11.44
Bijoy Kumar	19.35	25.73	54.92	17.39	28.76	53.85	89.58	10.42
Sakhicharan	14.37	23.65	61.98	14.26	27.54	58.20	91.52	8.48
Ramkrishna As.	18.48	25.56	55.96	16.58	29.32	54.10	88.28	11.72
M. T. Girls'	16.23	23.52	60.65	13.56	30.62	55.82	90.42	9.58
Netaji Subhash	15.75	26.39	57.86	14.23	32.28	53.49	89.35	10.65
Agartala	16.76	24.55	58.69	314.84	28.28	56.88	89.45	10.55

From the obtained results (Table-4 & Fig.-2, 3 and 6) it is quite clear that pupils' relation with their parents, teachers, siblings, classmates and neighbours have a direct effect on their mental retardation. Apart from these parental separation is one of the major factors for the mental retardation of their children as revealed in the results.

Fig. 2.

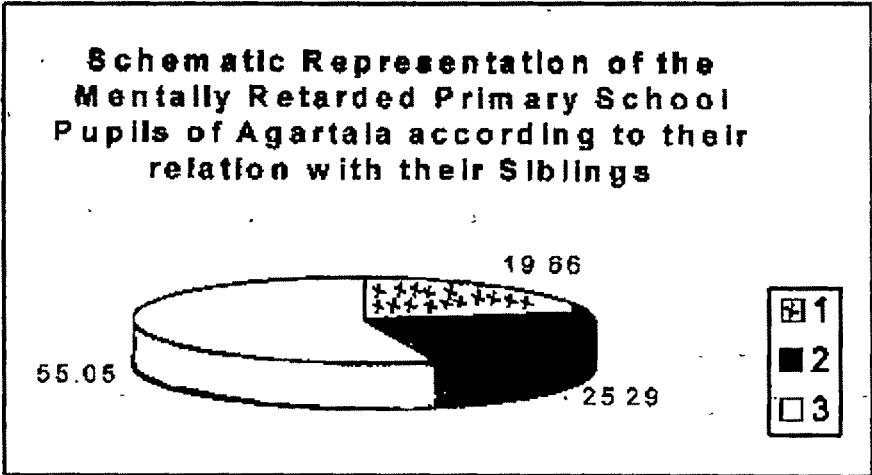
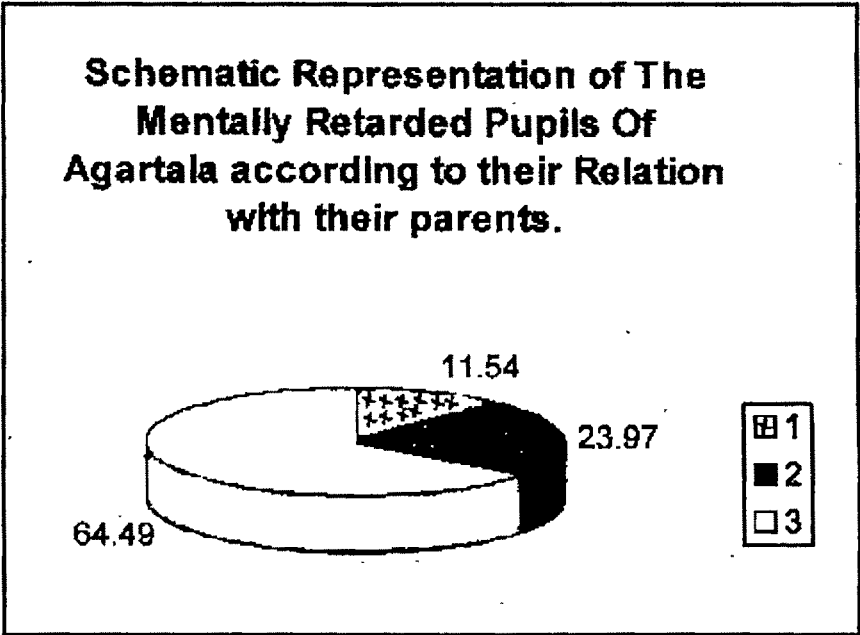
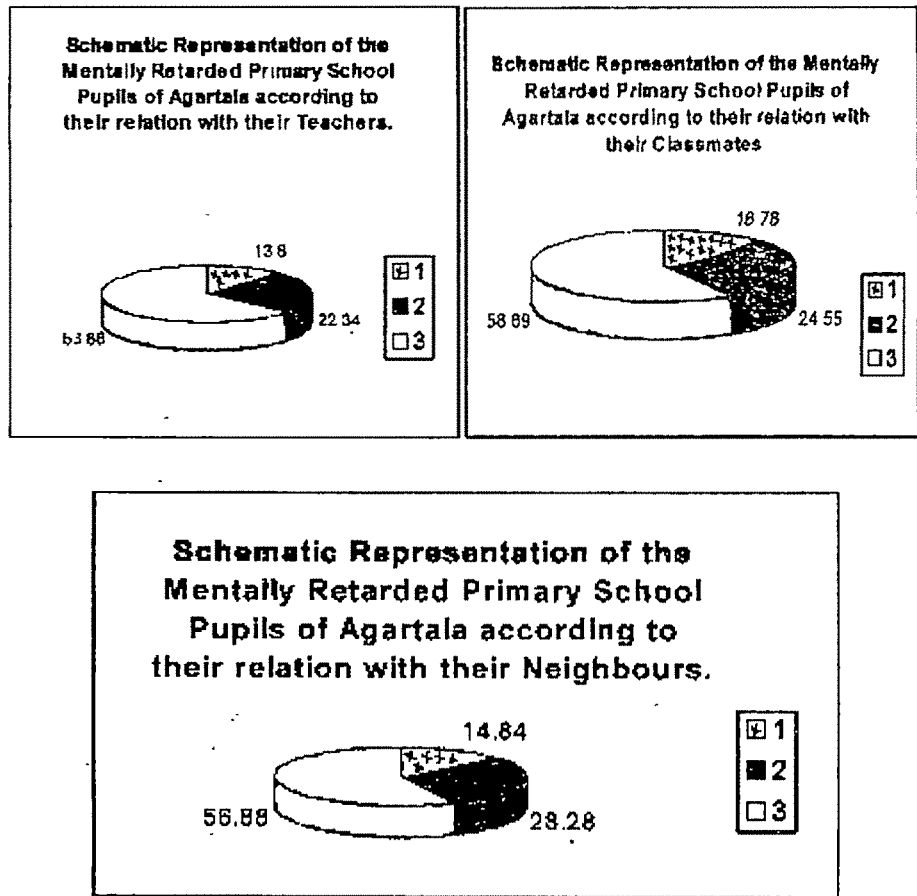


Fig. 3.



**Fig. - 6 : Schematic Representation
of the Mentally Retarded Primary
School Pupils of Agartala due to
the Separation of their Parents.**

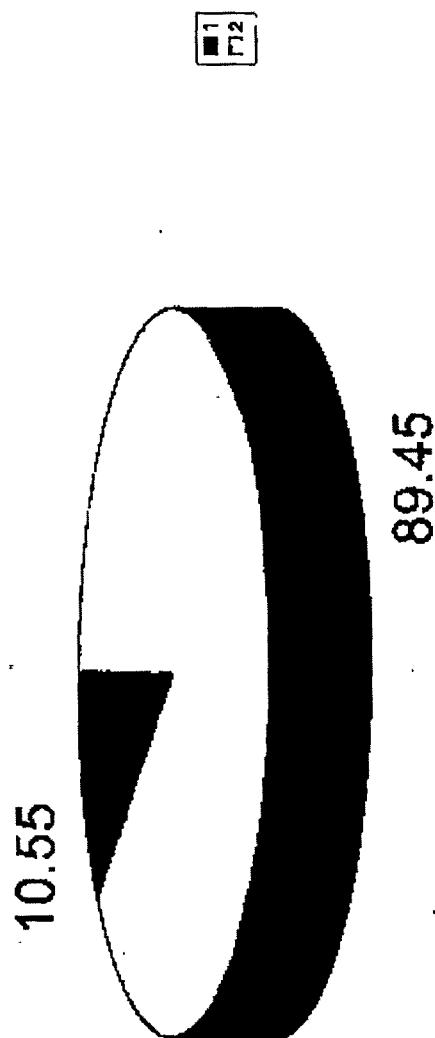


Fig. 4.

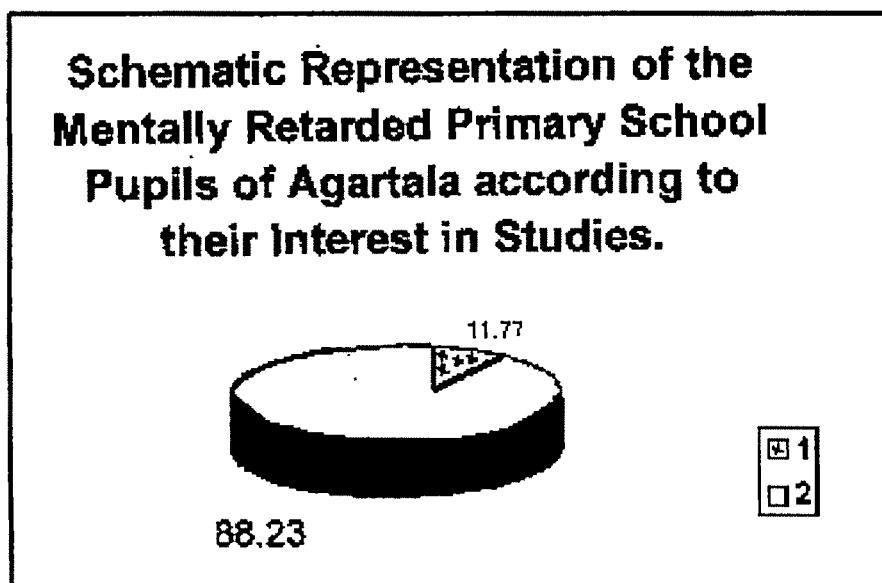
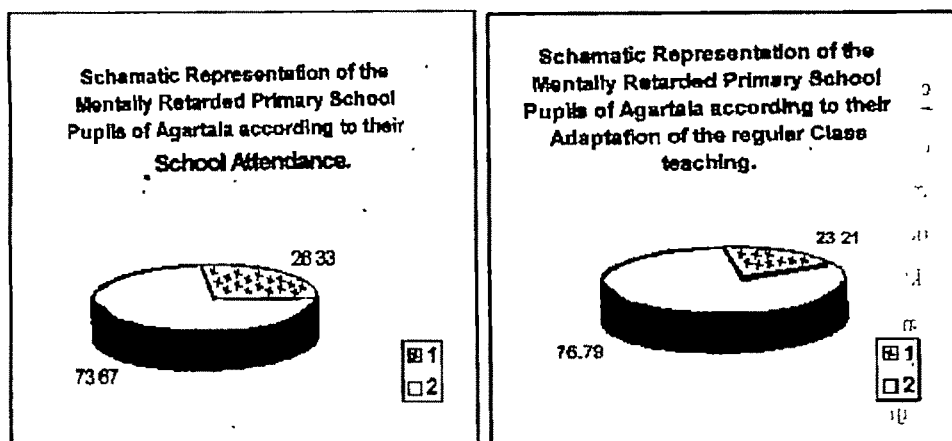


Table 5 : Schoolwise proportion of mentally retarded primary school pupils of Agartala according to their school attendance, following regular class teaching and interest in studies.

Schools	School attendance		Following regular class teaching		Interest in studies	
	Regular	Irregular	Yes	No	Yes	No
SishuBihar	24.52	75.48	22.76	77.24	10.73	89.27
Umakanta	26.39	73.61	20.35	79.65	11.52	88.48
Bijoy Kumar	27.48	72.52	23.85	76.15	9.71	90.29
Sakhicharan	25.72	74.28	21.39	78.61	12.39	87.61
Ramkrishna Ash.	24.64	75.36	24.52	75.48	11.35	88.65
M.T. Girls'	28.67	71.33	23.78	76.22	12.94	87.06
Netaji Subhash	26.87	73.13	25.82	74.18	13.76	86.24
Agartala	26.33	73.67	23.21	76.79	11.77	88.23

From the obtained results (Table-5 and Fig.- 4) it is evident that mentally retarded pupils, are irregular in school, do not follow regular class teaching and for that they do not have any interest in studies.

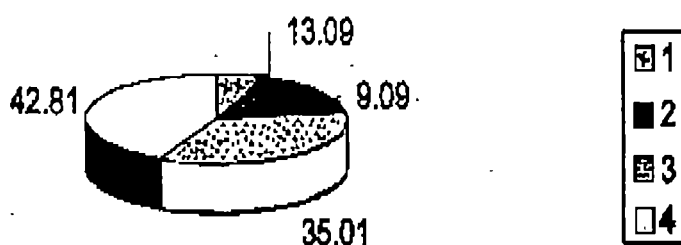
Table 6 : Schoolwise proportion of mentally retarded primary school pupils of Agartala according to the mode of their rectification by their parents and teachers for their disobedience.

Schools	<u>Mode of rectification of pupils for their disobedience by their</u>							
	<u>Parents</u>				<u>Teachers</u>			
	Ignore	Counsel	Scold	Beat	Ignore	Counsel	Scold	Beat
Sishu Bihar	12.47	9.57	35.20	42.76	15.65	8.85	28.93	46.57
Umakanta	13.35	8.42	32.73	45.50	16.36	9.52	30.34	43.78
Bijoy Kumar	11.76	9.65	34.39	44.20	12.45	8.77	31.52	47.26
Sakhicharan	12.53	10.25	39.43	37.79	13.58	9.39	30.45	46.58
Ramkrishna As.	11.72	9.39	33.70	45.52	13.69	8.66	35.39	42.26
M.T. Girls'	14.53	8.85	36.63	39.99	15.34	9.42	33.94	41.30
Netaji Subhas	15.28	7.54	32.97	44.21	14.85	8.27	32.68	44.20
Agartala	13.09	9.09	35.01	42.81	14.56	8.98	31.89	44.57

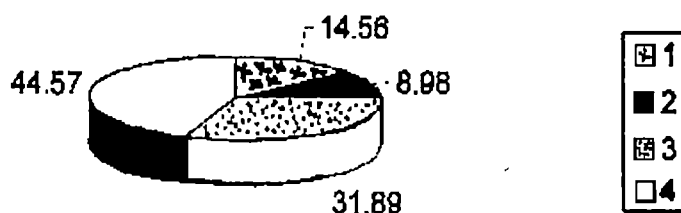
From the obtained results (Table-6 and Fig.-5) it is quite clear that regular scolding and physical assault by the parents and teachers in the name of

Fig. 5.

Schematic Representation of the Mentally Retarded Primary School Pupils of Agartala according the mode of rectification by their Parents for their Disobedience.



Schematic Representation of the Mentally Retarded Primary School Pupils of Agartala according to the mode of rectification by their Teachers for their Disobedience.



rectification of the pupils for their disobedience lead them towards mental retardation. It is also clear that counselling is the only ideal mode of rectification.

Conclusion

From the obtained results it is quite clear that on the average a sizable proportion of primary school population of the North Bengal Districts have been suffering from mental retardation, of which North Dinajpur district is on the top. It is also evident that apart from heredity there are certain other factors responsible for the mental retardation of these pupils which are as follows.

- (i) Indifferent and strained relation of the pupils with their parents, siblings, teachers, classmates and neighbours.
- (ii) Often contention of the parents in front of their children.
- (iii) Separation of the parents.
- (iv) Regular scolding and physical assault by their parents and teachers in the name of rectification for their disobedience.

As they are slow learner they can't follow regular class teaching and absence of any remedial teaching in the school they gradually lost interest in studies and become irregular in school and ultimately dropout from the school. To overcome this problem certain rectification measures may be helpful which are as follows.

Suggestions

- (i) In each primary school provision should be there for I.Q. and other psychological testing in order to detect the mentally retarded pupils right from their enrolment.
- (ii) These pupils are to be segregated in a separate section of the class.
- (iii) Special method of teaching are to be provided to these pupils with enough time so that each of them can follow the course curriculum clearly.
- (iv) Teachers should motivate these students so that they can regain interest in studies and attend school regularly.
- (v) In no way their results and grades in the examination are to be compared with those of normal pupils.
- (vi) Scolding and physical assault should be strictly avoided. Counselling is the only and best method of rectification.
- (vii) Parents and teachers should not neglect these children and efforts should be made to increase the attachment and have a good relation with them.
- (viii) Joyful learning programme which has already started in some schools of a few district of the state should be extended to all the primary schools of the state.

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Application of Psychology for the welfare of society

VIDHU MOHAN

At Times one finds it difficult to say where Psychology begins & where it ends. As long as there are human beings and they behave, there will be Psychology as “the science of human behavior”. We can study it for individual’s self-growth and also for the welfare of the society. The society is made up of individuals, if we improve the quality of life of individuals, we can change the entire society. Material enrichment can be meaningful only when the user has a value system to govern it, otherwise it becomes like the use of nuclear energy for destruction purposes as happened at Hiroshima and Nagasaki. For the present purpose I will be delving into the application of Psychology for the welfare of society through the enrichment of the individual, so that he/she can contribute to society.

We have to see whether over the years we have enhanced our Quality of life or not. Every individual wants to lead a life of fulfillment and happiness. But in reality do we find people happy and contented? Perhaps no. We receive training for a profession but are we given training for leading a healthy and wholesome life? Again the answer is a big ‘No’. For a good quality of life one needs proper training and preparation right from the start. Counseling for healthy orientation towards life is a must. This begins right from the child through child rearing practices. This is done through adequate socialization the groundwork for which is laid in homes, schools, community agencies and other socio-environmental groups. The present scenario is such that parents do rearing without having any psychological inputs, schools have become more like teaching shops with emphasis on an industry-like production of degrees. This mechanization in the approach to produce a complete human being is ruining the orientation to quality of life and wholesome personality development. Hence to enrich society we have to help the individual develop fully.

1. Personal Development

Earlier the author (Mohan 2002) had opined, “In India, development is a phenomenon, which is still on wheels. This growth has to be an all-round event in the life of people. Mere economic growth or literacy don’t make the complete quality of life, it has to be education and inculcation of values for betterment or the development of the ‘EQ’—the Emotional *Quotient* and the ‘SQ’—the *Social Quotient & Spiritual Quotient*. Goleman (1995) has espoused the cause of developing the ‘EQ’. Quoting Sternberg and Salovey, (in Goleman, 1995), he expands the concept of ‘EQ’ into five main domains viz :

1. Knowing one's emotions : Self-awareness and recognition of one's feelings.
2. Managing emotions : like 'Alexithymia' or emotional apathy, Kennedy & Charles (1997).
3. Motivating oneself : includes emotional self-control-delaying gratification and stifling impulsiveness.
4. Recognizing emotions in others : use of empathy.
5. Handling relationship : interpersonal effectiveness.

The author has been successfully using these strategies in her 'PDP' (personal Development Programs) sessions with many Commonwealth Youth Trainers (Mohan, 1997). There is a great deal of need to develop these interpersonal and self-awareness skills. More so in the case of the Indian youth who is facing many cross roads of influx of the western culture and loss of their own belief systems and ideologies."

The author, in her twenty five years of training programs with the Commonwealth Youth Trainers from all over the Commonwealth countries, has been imparting skills for 'PDP'. In order to achieve this personal growth the strategies adopted so far by the author, are presented below:—

a) Understanding self :

The first things to be done for self -development is to know and understand ones own self. I have used the concept of 'JOHARI Window', to develop self-awareness as perceived by one and others. For doing this I have used the four quadrants -namely- 'The Open Arena', 'The Blind Arena', 'The Hidden Arena', and 'The Dark Arena'. The goal of self development is to enhance quadrant 1- the Open Arena. All other quadrants have to be reduced. The 'Blind Arena', since it is known only to others, is reduced by feedback~ the 'Hidden Arena', since it is known only to the self, can be reduced by 'self-disclosure', The 'Dark Arena', is unknown to both self and others, hence it can only be explored through scientific exploration through the use of psychological tools. The details about exploring and redefining one's own self can be had from a training manual written by the author (Mohan 1997). One can also explore one's assets and liabilities as perceived by self and others through the method of 'Self -exploration' & 'feedback'. This is best achieved in small groups with the help of a trained facilitator. Ways to modify and reduce the liabilities and consolidate assets can also be accomplished in these groups. The more we expand our 'Public-Self, the better we become and have more Psychic energy to contribute to society.

The Johari Window is presented below :

JOHARI-WINDOW

SELF

Known

I.

Can be reduced
through Feed-back

III.

Can be reduced
through Scientific
Exploration

Unknown

II.

Blind Arena
Bad breath
social hindrances
Not acceptable to others.

IV.

Dark Arena
Unoknown to both Talents
as well as Liabilities.

b) Determining one's life goals.

In order to have a better understanding of self, one must learn what are one's life goals. In the workshops conducted by me on time management, I found that even senior executives were not aware of what they wanted from life. In an exercise developed by me, I found that often the career goals conflicted with the family demands or the values one wanted and nurtured. These often clashed with the job demands, or the material goals or personal goals. The inter-goal conflict often leads to a considerable turmoil in one's life. Counseling here means helping people in identifying what one wants from life and how one proposes to achieve them. To lead a contented life one must formulat   a 'Macro' level goal, which is a 'Unifying' principle of one's life. Then one can break it up into 'Micro' level goals, which have a time frame, and contribute to the overall 'Unifying' principle of one's life.

c) Managing ones time adequately

Often people find that they are under a lot of stress because they cannot cope with the time pressure, We can have broadly speaking, four types of time-spent namely: Creative time; Wasted time; Crisis management time; and Routine work time. These can further be split into a 2  2 contingency based on important and unimportant tasks and urgent and not urgent time. Mostly individuals don't know how to decipher the urgent from non-urgent, the creative from routine time, and the important from unimportant tasks. As a result they waste their time in doing what they should not be doing and then feel guilty about squandering their time. Proper planning and determining one's priority, is an essentiat task for time management.

Time Structure

	Important	Unimportant
<i>Urgent</i>	Deadlines Work that demands immediate attention due to time pressure.	Pressing tasks but unimportant like emergencies.
<i>Not Urgent</i>	Creative time. Doing something which is productive & useful having long range goals.	Time wasters like reading junk mails, attending to unscheduled visitors meant for others, or phone calls for others.

d) Managing our negative emotions

Emotions are an integral part of the self. Some are positive emotions like 'love', 'joy', 'happiness', but some are unpleasant and can be a source of inconvenience, like 'anger', 'fear', 'hatred', 'anxiety', 'depression', 'sorrow', 'jealousy', 'loneliness', 'guilt', 'shyness', and such like. The list of unpleasant emotions exceeds in number over the positive emotions.

These have been given in the flow chart given below :—

Emotions

Negative Emotions

Anger : *Frustration* : *Annoyance*
 Fear : *Apprehensions*
 Anxiety : *Stress* : *Tension* : *Worry*
 Sadness : *Sorrow* : *Depression*
 Jealousy : *Envy* : *Hatred*
 Guilt : *Shame*
 Loneliness : *Shyness*.

Positive Emotions

Love : *Affection*
 Joy : *Mirth* : *happiness*
 Peace : *Tranquility* :
Contentment

These negative emotions have to be dealt with, controlled, and managed. Each negative emotion has its own special strategy to cope with. For instance in the case of anger, one has to see what is the source, why is it taking place, and whether it can be dealt by the person or the environment in which one lives is responsible for anger. In the case of fear again the source can be external, or residing within the mind of the individual. Anger, hatred & jealousy are the emotions, which underlie much of the violence that we face in our society. Giving a meaningful turn to these negative emotions through strategies like 'Sublimation', or control, or diversion, one can ultimately make the world a better place to live.

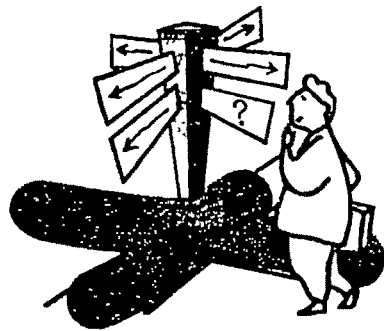
e) Coping with the intra-personal conflicts.

All of us experience some conflict or the other from time to time. These may be interpersonal or intra-personal in nature. Some time we can cope effectively

with these but at other time we just fail miserably. Usually the strategies adopted by people can be classified under “3F’s”;

- Flight,
- Fight
- Face

Both strategies of ‘Flight’ or ‘Fight’ leave a residue of unresolved issues. The appropriate way of resolving the conflict is to ‘Face’ it or confront it. In order to do this one has to first of all, know what are one’s usual ways of dealing with conflict and whether these are effective or unproductive. Often people indulge in procrastination, daydreaming or withdrawal, these are methods of ‘flight’; or people show aggression on others through blaming, projecting, rationalizing, threatening, these are methods of ‘fight’. These strategies are unproductive and lead one into more trouble rather than reprieve. But when one adopts method of problem solving-seeing and weighing the pros & cons of the matter, one’s own goals & the goals of others, face the situation and arrive at an optimally useful decision, one is a winner. One should emerge from a conflict with a happy face & not live in a confused state as shown below:



f) Improving Interpersonal Skills.

We are often unaware of the suitable ways of relating to others. Sometimes we push people away from us because we use a language, which is inappropriate, or our body language is negative, or we are not sure what we really wish to communicate. In my workshops on ‘feedback’ a girl received a feedback of being arrogant and overbearing, but in reality she was just trying people to see her point of view. Proper communication skills imply knowing what other person feels i.e., empathy; observing the non-verbal and verbal cues of others; listening attentively, to what the other person is trying to say. Mostly people think that only non-stop talking is equivalent to good communication. Sensitizing one to the needs of others, feeling for them, trying to see things from their perspective, makes one more adept in interpersonal skills. Listening, perhaps is the best way of communication. But one finds it conspicuous by its absence. People try to push their messages to others rather than listen what

the other person wants to say. Most of the conflicts & misunderstandings take place because we don't bother to listen to the feelings of others. The feelings are communicated most often through non-verbal method, which is the 'body language'. This language can be read only when we attentively observe the facial cues, the tone of the speaker and the body language.

h) Coping With Stress.

Stress and anxiety are all extension of negative emotions. Yet in the present day world they have their own span and salience can be external, or residing within the mind of the individual. Life these days has become full of tensions, problems and strife. Family support systems, community support systems-have diminished. There is more general apathy, alienation, and passive indifference. People live under duress and constant tension of facing something uncalled for and unforeseen. Daily friction and erosion of support systems have reduced the capacity in individuals to cope with the stresses. Stress can make one's life miserable if one does not know how to cope with it. The first step towards coping with first day at school stress is to know what causes stress. Then one should determine whether the source is external or residing in the environment or it is within the individual. Then the areas of coping exist in the management of stress. A brief summary of these three are presented below :

Causes of stress

These can be divided into routine stressors, sudden crisis, environmental pressures & stress due to one's own personality.

Developmental crisis : routine stresses of each stage of growth like:

- **Birth :** Tiding over the birth trauma – both from the mother's and the child's point of view and adjustment to the external world.
- **Baby hood :** gentle weaning, proper toilet training, adjusting to discipline.
Early childhood : the transition from home to school- first day at school-the breaking away from home protection.
- **Later childhood :** adjusting to peer group pressures.
- **Adolescence :** the period of storms & stresses. Adjustment to one's own sexuality. The transition from school: to either the world of work of higher learning, or professional education.
- **Adult hood :** choosing a vocation, marriage, & parenthood. Entering the world of work: making adequate vocational adjustment. Entering into the 'Grahasth Ashram' — the family life. Becoming a parent: learning how to rear up children in a psychologically healthy manner: and appropriate socialization of the child.
- **Middle age crisis :** both the male and female menopause. Adjusting to job escalation—climbing the pyramid, and adjusting to the children's leaving the nest.

- **Retirement** : depression-saying good-bye to formal work and all the power and status associated with it.
- **Old age** : Coping with the process of aging -physical debilitation and mental slowing. Also the death anxiety.
- Apart from Developmental Crisis there can be other factors causing stress. These have been briefly enumerated below :

Situational crisis

- Sudden trauma. like some catastrophe happening all of a sudden.
- Accident
- Death of near or dear one.
- Job trauma & stressors: such as change of a boss, or transfer to a hostile environment.
- Family disaster: strife or break up in the family.

Environmental Pressures

- Ecological stressors, such as crowding, pollution, etc.
- Social & cultural norms & changed value system, adjustment to new norms.
- Economic stressors, such as escalation of prices, reduction in interest rates, insecurity of regular income.
- Nutritional imbalances, such as more intake of junk food leading to obesity & disease.
- Psychological fears & apprehensions such as those which arise due to uncertainty of life due to family bonds being shaken up, lack of trust and confidence in friends, lack of sincerity etc.

Inherent predispositions

- Personality traits causing stress, such as anger, anxiety predisposition, suspicious nature, Type-A personality to mention some.
- Conflict resolution styles : such as withdrawal or aggression.
- Attitudes : such as negative perception of others & situations.
- Belief systems: like believing in too many superstitions, or belief in too many rituals & fatalism.
- Emotional predispositions: such as having more of negative emotions dominating one's style of reacting.
- Habits: such as being disorderly, unkempt, disarray in keeping objects as well as thoughts.

Effect of stress

- **Effect on body** : psychosomatic disorders which may be broadly classified into the major systems in the body & the associated diseases such as :
 1. Respiratory tract : such as asthma, bronchitis, nasal catarrh allergy.

2. Digestive system : constipation, irritable bowel syndrome, flatulence, and ulcers.
 3. Blood circulation: high or low BP, heart problem etc.
 4. Skin; urticaria, eczema.
- Behavioral outcomes : use of defense mechanisms, and plus gesture.
 - Mental breakdown; reflected in psychosis, neurosis, distorted thinking, memory losses, suicidal ideation.

Coping With Stress

The sooner we turn our attention towards coping with stress the better our quality of life becomes. Some of the ways to cope with stress have been enumerated below: (*Mohan (1989)*).

- Physical: through physical exercise such as walking, deep muscle relaxation, Yoga. Taking balanced & healthy Nutrition.
- Mental: change of personal attitude towards life- developing positive thinking. Having positive self-concept and regard for others, leads to ‘I am O.K. — You are O.K.’, life position. ‘Do stress-inoculation by giving self-instructions for positive thoughts or by using coping imagery. Mind expansion through imagery as has been used by the author in some of her research work.
- Emotional : through management & reduction of negative emotions such as anger, hatred, and jealousy. Flooding’ or giving full exposure to the emotion : causing disturbance & getting rid of it. For example if one is afraid of some thing, give a full exposure to that thing or situation to be through with it. Using ‘catharsis’ or giving vent to your feelings, as a strategy to rid yourself of unwanted feelings.
- Social: socio-psychological management i.e., by cultivating social support systems, such as family, friends and relatives.
- Spiritual : Spiritual growth, or self-actualization, through meditation, study of religious sayings, and keeping company of virtuous persons.

2. Family life Adjustment

Family happens to be the basic and smallest primary group of any society. If there are happy well-adjusted families, the society too becomes a blissful place to live in. It is a place for relationship development and preservation. A brief review of how psychology can help to build better family bonds is given below:

Family adjustments :

- Pre-marital counseling & preparing for married life.
- Learning to cope with marital discord, facing problems of break up & divorce.
- Learning good parenting, giving child a healthy childhood.
- Helping elders in the family to cope with life.

Marital Adjustment : Marriage is the most fundamental institution, which initiates the family unit. According to D'Souza (1979), "Marriage is a school where two people must learn the difficult art of living together." It is this 'living together' in a cordial ambience, which is a very up-hill task. According to Rathus and Nevid (1980), marriage is "a continuing commitment to help one another, to share intimate feelings and experiences, and to regard each other occupying a special place in each other's life. Marriage is an institution of close complimentary co-operation. It's success or failure depends on the couple's ability to work together as a team." On the other hand, conflict arises over issues, which range from material factors to inter-personal relations. Mohan (1989a) enumerated these as conflict over money matters, child rearing, sharing of household chores, sexual discontent, and relations with the in-laws, social relations, interpersonal expectations, and loss of self-esteem in either partner. Such type of conflicts can also lead to break-up and divorce. Proper training is required at the pre-marital stage and then intermittent training and counseling for healthy marriage from time to time.

Parent – Child Adjustment : The author (1994) had discussed that mothers who are educated can give much better in-puts in child rearing. It was also suggested that adequate child rearing practices could be taught to the parents. Bringing up a child to become a healthy, wholesome personality is much more difficult than giving birth to a child. The human child has the longest childhood and needs careful rearing to be a complete person. Mohan and Kaur (1989) had researched in the various ways in which adequate rearing can be done. Ten areas were described through which a parent can reveal his care. These are revealed by parental interest and involvement in the following:

- Academic affairs- taking interest in what is happening in school and providing material etc.. Many parents feel only telling a child to finish homework is all; but cultivating love for studies is also the job of parents.
- Social interactions: knowing the peer group and friends of the child, respecting his/her social affiliation and also keeping a track of negative and harmful associations.
- Recreation: such as taking care of the child's leisure time activities, planning for vacations, sharing of happy moments with the child.
- Financial status: making the child has money of his own and help him/her to manage it. Giving regular pocket money is one of the ways to make child feel financially independent with dignity.
- Nutrition: taking care of diet and seeing that the child gets a balanced healthy diet, Seeing that intake of junk food does not exceed a limit.
- Clothes: providing decent clothes, not necessarily very expensive, and seeing that the wardrobe is updated.
- Puberty Development: Helping the child in understanding his/her own body & sexuality, and relationships involved therein.

- Demonstration of love: showing love through physical touch.
- Personality development through identity development, self respect, autonomy, diligence, & synergy in all areas of development.
- And Health care, taking child for regular medical check ups, seeing that all immunizations take place at the right time.

Caring for the elders in the family : Longevity is becoming a fact of life. In India too, more attention is being paid to the problems of the elders. In earlier times the joint family used to take care of the single, ailing aged, but with the trend of nuclear family, one finds more and more aged people in adverse condition. Mohan (1988) gave a detailed account of what counseling propositions were there for the care of the aged. I had discussed there at length the type of physical, mental, emotional, and social anxiety and insecurity they have to face. I had also spelt out the role of family counseling and support. In another work (Mohan & Mohan 1988) we found that the attitude of the children-sons, daughters and daughters-in-law was not very favorable towards the upkeep and maintenance of the parents. Especially the son's family was not very positively predisposed towards the elders. It is for this reason that the ministry of Human Resource Development of India has. on 5th of Jan.' 99, promulgated a statute for the care of the senior citizen and has even made it mandatory for the children to look after their aged and dependent parents. The latter can go to the court to claim their right (Hindustan Times, Delhi edition, 05.01.99)

3. Educational and Vocational Growth.

The claim to education and subsequently the right to have some means of sustenance is constitutional right of an individual. Yet what will be the adequate course of action and choice, very few know. The two are interconnected since education leads to the preparation for vocation. Some of the major needs in these respective areas are given below :—

EDUCATIONAL NEEDS

1. *Adjusting to school life* : making new relations, adjusting to a formal discipline, being away from the near and dear ones, getting used to a test anxious situation, adapting to the competition in school, etc.
2. *Coping with 'Underachievement'* : not being able to perform up to the level of ones ability can cause feelings of diffidence and inferiority.
3. *Trying to keep up with the communion of holistic growth* of physical, mental, social, emotional and moral developments. This is especially true when one passes through the adolescent period in the school.
4. *Dealing with learning disabilities* : overcoming them and trying to reduce their negative outcome.
 - *Educational Counseling* : this can be done to reduce the stress in a school going child & make him/her enjoy this period of life. Some of the areas in which it can work are enumerated below:—

- a) School adjustment: helping the child to adjust to the new environment and make school a happy experience.
- b) Peer group adjustment: the peer group pressures may lead a child into trouble; hence helping individuals and groups towards a healthy orientation is necessary.
- c) Sex education: this involves helping a child to understand his/her body; puberty development-the growth of sex organs and related aspects of socio-emotional adjustment, morality and relationship.
- d) Academic achievement: coping with problems of under achievement, & other learning disabilities.
- e) Pupil personnel work.

VOCATIONAL NEEDS

Career Planning : To earn a living one has to make preparations long in advance. The school education is meant to prepare an individual for some vocation. But in many cases what one comes out within a school, is a certificate of literacy rather than a preparation for a career. The choice of a career is intimately linked with the type of education one has had. If schooling is through popular choices then careers also follow suit. The most coveted are in the following rank hierarchy :—

IAS, Central Services, MBA and corporate world, Technical jobs like medical or engineering, computer related jobs, and then the rest follow on a low bidding. There is an immense need for Vocational Guidance so that 'Job Profile' can be matched to the 'Person Profile'.

1. In order to plan a career one-has to do the following :—
 - a) Knowing one's own abilities, aptitude, personality make-up, interests, and value system.
 - b) Knowing one's environmental support systems as well as hindrances.
 - c) Having occupational information in terms of job profile and requirements.
2. *Training and preparation for career* : One should know where, how and when to get training; what are the financial requirements~ & what is the duration of training, etc.
3. *Job placement*; Choosing a job, applying for it, facing an interview and procuring it.
4. *Adjustment in the Job* : One may be able to get the job but find it difficult to adjust to a regimented routine, getting along with the superiors and subordinates, coping with the day-to-day tensions and stresses. Not only the choice but also the adjustment in a vocation is an important task. In some of the training programs conducted by me with various professional groups I found many young people to be very disillusioned by their choice of career. In a training course for CRPF directly appointed officers, a

- young officer told me that he had joined the police force because he thought that it would mean a lot of power and comfort, but in CRPF there was a lot of work and no power. Ultimately he resigned from the job. Similarly while conducting a training program for induction into an industrial organization, a young MBA said he was very dismayed by the nature of job and the length of working hours. He felt that the so-called 'big money' he was getting was not worth it if he had no time or freedom for himself. There are many such cases in reality that feel maladjusted in the job that they have chosen. Help is required to make adjustment in the job too.

- Vocational Counseling : this includes :
 - a) Career planning.
 - b) Knowing one's 'Abilities'.
 - c) Having Occupational & job information:
 - d) Training for interview.
 - e) Adjustment to the world of work.

4. Application of Psychology to the area of Work :

- Selection of right person: with the use of appropriate Psychological tests; The author has used appropriate psychological tools for selection purposes where not only ability is assessed but also personality & values are measured to make a round peg fit into a round hole, and square peg in a square hole.
- Motivational development, in self & others so that one can have job satisfaction.
- Managerial skills: such as Team building, resolving inter-personal & intra-personal conflicts, developing & motivating subordinates, developing adequate leadership styles and a vision, learning to delegate, reducing work stress, building two-way communication, managing time adequately.
- TQM & behavioral adjustment.
- Developing Quality Circles.

5. Application of Social Psychology for Social Welfare :

Use of group dynamics for social welfare : Team building: developing cooperation & mutual trust among various types of groups. Some examples of this application are mentioned below :—

- Communal harmony & racial accord: We are living in a world where strife amongst in-group and out-group due to religious communal racial, cast factors etc., has become rampant. Through counseling for healthy group interactions, cooperation, trust for each other, sacrifice for the good of others, at the school level, we can help in changing the society.
- Prevention of group crimes, & juvenile gangs: Though jails are called "Sudhar Ghar" but in actual practice they have become the training

schools for crime. Principles of re-education, conditioning for positive thinking, and counseling, can be conducive in preventative measures as well as reducing criminal orientations. All such phenomena as physical violence-crime, cruelty, juvenile delinquency, drug abuse, social apathy and ruthlessness, purposefully violating law and then enjoying doing so, indulging in corrupt practices, are forms of social deviance.

- Developing healthy & Effective leadership: In every walk of life, leadership is involved. It may be the family, or school/college, or organizations, leader—lead situation exists. Proper training in effective leadership styles is essential.
- Good Samaritan: bystander intervention & help has become more or less absent. It has been substituted by bystander unresponsiveness and apathy. Altruistic orientation and helpfulness can be inculcated as values in childhood.
- Adjustment in the primary group i.e., the 'Family': Family tensions & discord is constantly on the rise as observed through increase in divorces, break-up and single families. Family counseling and building bridges of communication in the family, sincerity and trust, are the tasks, which a psychologist can take up.
- Developing Pro-social behavior: behavior like cooperation, altruism, helpfulness, respect for others, etc., are some of the pro-social responses which should be inculcated right from the childhood. These form important aspects of socialization.
- Promoting healthy Interpersonal relations, intimacy.
- Obedience versus defiance, conformity behavior.
- Community development for social welfare & values inculcation. Next to the family community is the subsequent important group where an individual learns his values and social skills. Many forms of violence and anti-social behavior germinate from the society in which we live. Making our psychological environment pollution free is as important as keeping the geographical environment pollution free

6. Childhood Issues.

- a) Genetic counseling: the foundation of a healthy individual is laid at the time of conception. Our scriptures say that cohabitation for the purpose of progeny should be planned under auspicious "Mahurat". Genetic counseling is meant for the purpose of helping parents to understand the importance of the genes and have fetal testing done so that in case of abnormality the pregnancy may be terminated. It is also done to help couples understand if there is some factor, which is incompatible in them, then proper precautions may be taken; or if one partner has some latent disease, prevention may be done.

- b) Socialization processes-adopting healthy child rearing practices. This has been already discussed in the family issues. Proper parental attitude and rearing practices go a long way to help in the growth & development of the offspring.
- c) Educating people who are involved with looking after children such as creche workers, CDPO's, Anganwadi workers & the like. These days many couples are working. In this situation children have to be looked after by someone else than the mother. Children are left in the creches. My experience as honorary secretary general of ICCW, Chandigarh, has shown that majority of the Bal Sewika's are hardly acquainted with the "Developmental stages" & issues. & problems related with these stages. Trained Psychologists should impart training for adequate child rearing to these surrogate mothers so that they can look after the small children suitably. More organizations like NIPCID, New Delhi, should launch a nation wise campaign for updating these workers. There should also be some way of checking the workability of these creches, Anganwadi's, as many unauthorized one's function from private homes for commercial purposes. Some time children are even physically abused in these centers.
- d) Childhood disorders & Disability: Many children face a number of problems in early childhood, which if detected early can be treated. Preventing them & helping to cope with them becomes a major responsibility of medical professional & Counselors. Some of these are given below in which early intervention can be of great help :—

- Autism, cerebral palsy, Dyslexia, Mental sub-normality in children, is one group of disabilities, which should be taken care of at the earliest. Autism is a type of pervasive developmental disorder (PDD). It interferes with a person's ability to communicate with and relate to others. It is a lifelong condition that results in some degree of social isolation. Autism affects how a person perceives and processes sensory information. Signs of autism almost always develop before a child is 3 years old, although the condition is frequently not diagnosed until later. (NIMH, 1998).

Dyslexia is often mistakenly viewed as a severe reading impairment rather than a syndrome LD – learning disabilities. Dyslexia is a syndrome of many and varied symptoms differing in intensity. And thus some dyslexics will have severe reading, spelling and speech difficulties while others will have major problems with only math, memory and concentration or difficulties with writing, grammar, memory, speech, sense of direction and time, etc. Yet all suffer from an inner-ear-determined dysfunction.

A child has "special educational needs" if he has a learning difficulty which calls for "special educational provision" to be made for him. A child has a "learning difficulty" if he has a significantly greater difficulty in learning

than the majority of children of his age, or he has a disability which either prevents or hinders him/her from making use of the educational facilities generally provided in schools. Dyslexic children do have much greater difficulty in learning. "Special educational provision" means educational provision which is additional to or otherwise different from that made generally for children of his age in schools. (SEN, 2001) The earlier the intervention the better the learning outcome in such children. According to the disability act, it becomes mandatory for schools to provide special education for any disabled child.

- Handicaps: such as blindness, deafness, dumbness; orthopedically challenged, make the second group of disabilities. This group of children has a sensory or motor loss or deprivation. This loss can also affect their emotional & social make up.

Some of the intervention strategies were put forth by the author (Mohan, 2002a) while dealing with the issue of disability. These have been quoted from that keynote address:

Interventions for dealing with disability

Sr. No.	Medical	Aids & Appliances	Educational	Rehabilitation	Psychological
1.	Medical check ups	Visual aids, like lenses, sticks.	Special day School	Vocational training.	Counseling for emotional integration
2.	Medication	Auditory aids, like hearing aids, audiometer, etc.	Residential schools with specially trained teachers.	Training for managing money	Counseling for social adjustments, skills.
3.	Physiotherapy	Orthopedic appliances like wheel chairs, walker etc.	Integrated education with supplementary help.	Learning to market things produced by them.	Counseling for parents.
4.	Measurement of disability- extent of damage.	Use of Computer software for, speech learning etc.	Diagnostic prescriptive center.	Protecting legal rights for rehabilitation of such individuals.	Sex education.
5.	Hospitalization if required.	Creating barrier free environment for handicapped.	Resource teachers to supplement regular teaching.	Information about support systems.	Dealing with sorrow & grief.
6.	Surgery where required			Special employment bureaus dealing with placement of disabled	Learning to cope with life.

- e) Preventing juvenile delinquency. Juvenile crime, causes of delinquency, and treatment of offenders has become a major issue all around the world. What can Psychologists do to help decrease juvenile violence, is a major challenge. According to Mohan (2003), "Violence, anger, aggression, hostility, hatred, resentment, antagonism, are not mere words, but forms of human behavior which have existed in all ages, races, places, and walks of life. A small child can show anger so can an old person. This feeling is present in all and not a special feature of adolescence. The only difference is that in other periods of life it is restricted and contained, but at adolescence these feelings may be more turbulent and the resultant actions may be violent". Violence can be classified in many ways,:

	Towards Self	Towards others
By Commission	Using foul adjectives for one. Pouting, sulking Hurting oneself physically; Suicide	Using foul adjectives for others & abusive language Hurting others physically, Homicide. Sexual violence.
By Omission	Not eating food, Not talking to family members, Not even having physical proximity. Depriving one of goodies.	Not interacting with others, Not replying to questions. Withdrawing physical or psychological props from others.

At the adolescence period these behavior patterns may be seen in the form of temper tantrums, physical violence, and self-denials and renunciations. When this violence turns to external social set up, it may take the form of 'Juvenile delinquency'. It may be defined as a conduct of a juvenile, which thwarts the law and brings the perpetrator into the ambit of adjudication of law. In other words these are criminal acts performed by persons under 18 years of age, which is co terminus with the adolescence period. These criminal acts have been classified by Mohan (2002b) as follows:

Category	Body offence	Property offence
Major crime	Murder, assault, rape, abortion, major injury, kidnapping.	Theft, burglary, robbery,
Minor crime	Hitting, aggressing & causing minor injuries, eve teasing, stalking.	Petty thefts, trespass, breaking others property, and such like.

The author had also suggested certain strategies to prevent such a behavior & protect adolescence from entering into the world of crime.

Preventative Measures

- Providing 'Sex Education' to both boys & girls. This implies that they should be taught scientifically about their own body & their sexuality. They have also to be imparted knowledge about what is important in male female relationship and how to lead a healthy meaningful life. This further implies that they learn to develop a synergy between physical, intellectual, social, emotional & moral developments.
- Conduct '*Gender Sensitization Workshops*' for both the sexes. These workshops will bring awareness regarding gender roles, differentiations, inadequacy & what should be done for a healthy life.
- Have workshops for overall 'life skills'. These would include knowing oneself better with assets & liabilities; one's intra-personal, conflicts; complexes; fears and apprehensions; needs and motivation, life goals, etc.
- Hold workshops for parents to teach them what are the parameters of good child rearing. Often parents don't know their own attitude towards their own child. Parents also have to learn the ways to show their love & concern for their children. Preparing children for puberty development is the weakest in most of the parents, hence teaching them about human sexuality and growth becomes significant.
- Holding in-school sessions with entire classes, or with smaller groups of Students, or with individual students is very relevant in helping youth to adjust to life. These sessions can be very useful in letting students know that their fears and concerns are normal reactions. Involve mental health professionals in these activities if possible.
- Have an over all program for an all round development which can include the following:
 - a) *Physical means* : "A healthy mind in a healthy body" is an old saying with a lot of truth in it. This can be cultivated in young people with the help of :
 - Physical exercises.
 - Yoga
 - Balanced & healthy Nutrition
 - Relaxation
 - b) *Psychological means* : Mind controls the matter. In order to bring, one's mind to a state of peace and tranquility the following steps can be taken to help the adolescent:
 - Bringing about a change in one's attitude—develop positive thinking.
 - Learn techniques of time management.
 - Try to cope with one's conflicts by facing them and not procrastination.
 - Learn better interpersonal skills.
 - Learn to relax and try out new alternatives.

- c) *Social Support Systems.* Man is a social animal. As Maslow had said we all thrive on 'Need for Affiliation', we need to relate to others and in the process get fulfillment, but sometimes our youth are handicapped by not knowing these skills. In order to make best use of these social support systems the youth should be taught to:
 - Take the help of family members -they are your allies.
 - Seek the help of sincere friends.
 - In job situation, seek the help of honest and sincere colleagues.
 - Even religion can help in reducing stress.
- d) *Seek Formal Help.*
 - Go to a trained counselor for help.
 - Join formal groups where training is imparted for coping strategies.
 - Join courses imparting self-development skills.

7. Clinical Disorders

- Psychosomatic problems: Mind effects body & body effects mind, Now even at WHO, it is recognized that psychosomatic disorders are a reality. Most of life stresses lead to these disorders. Counseling and psychological treatment plays a major role in giving relief to such patients.
- Personality disorders: These have been recognized by DSM IV. In many such cases medication has to be supplemented by intensive psychotherapy. In many such cases family life can be disrupted very badly. Some help is to be given to such patients through psychological means so that reprieve can be there not only for the individual but also for the entire family.
- Emotional disorders: These have been discussed earlier in coping with negative emotions.
- Crisis management in disease like Cancer, AIDS, Heart failures, & other major fatal diseases.
- Drug abuse is on the increase worldwide. This brings in its wake problems like crime, sexual violence, and suicide. Preventative & curative counseling for drug addiction, alcoholism, can bring a lot of solace to the addict as well as to the immediate family.
- *Sexual Violations* : Too much exposure to unhealthy sex and experimentation, unwed mothers, recently an eleven year old girl gave birth to a child, promiscuity resulting in AIDS, using even computer technology for pornography and harassment, indulging in pre and post out of matrimony sex, using children for both Homo and heterosexual sex.

8. Diverse Areas or Application of Psychology.

The application of Psychology for the welfare of humanity can fill volumes.

Apart from the applications discussed above, some wide-ranging application in many areas of humankind are enumerated below:

- i) Counseling & Disaster management: Natural & man made disaster can spell a heavy toll on the mental balance of person affected by it. Skilled persons are required to help persons undergoing a traumatic situation.
- ii) Counseling for Sports: Playing games is not only a motor activity. It is a psychomotor activity. The player needs counseling in order to focus attention on his/her target, at the same time cope with the anxiety & stress arising out of a competitive situation.
- iii) Gerontology: Over the years, we have witnessed longevity increasing. With age we also have to face the problems of aging. There has to be not only care for the aged, but also help them to lead a happy life.
- iv) Ecology & issues related to crowding behavior: With the expansion of population problems of crowding, insecurity of jobs, less space, etc. is on the increase. These situation again require psychological treatment.
- v) Space Psychology.
- vi) Consumer Psychology: advertising behavior.
- vii) Women & gender issues: Gender discrimination, emphasis on women empowerment, conservatism in still looking at woman as an object to be used only, have given rise to many problems. The perception of "Feminine Worth" in the eyes of females and males varies to a great extent. (Mohan, 1999).
- Viii) Psychology of trust-betrayal, Love-affection. Relations are an outcome of trust and love. But often it is observed that people know neither one nor other. Most of bitterness in family and in friendship is because of lack of understanding of the true feelings of others. We have to be educated in how to love and build trust.
- ix) Happiness: it is like a butterfly the moment you try to catch it, flies away. In my workshops with various groups, I have observed that everyone wants to have happiness as their life goal, but when they are asked as to how they will get it they draw a blank. It becomes the duty of psychologists to help others discover for themselves the meaning of happiness and how to achieve it.
- x) Political Psychology.
- xi) Lateral thinking & management of change: Society is never stationary, alterations keep on taking place, values, and norms keep on redefining. This state of flux implies that we must be ready for it and set goals, which are in consonance with the welfare of society.

The list can be unlimited since psychology can be applied in all the areas where human beings behave & interact. Each of these areas can be a book

in its own right. In brief Psychology has the potential to give solace and happiness to people and society.

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